E-PROJECTS Work Order Number: 1168092

Appropriation: MCON

PART SIX ATTACHMENTS

Design-Build RFP for the

SIMULATOR CENTER and RANGE CONTROL BUILDING

at

Marine Corps Base Camp Lejeune
North Carolina

FY'16 MCON PROJECT P-1346

PREPARED BY:

HBA Architecture and Interior Design
and
Hankins and Anderson Architects and Engineers,
A Joint Venture
One Columbus Center, Suite 1000
Virginia Beach, VA 23462
(A/E Contract N40082-10-D-5301, Task Order 0025)

REQUEST FOR PROPOSAL PREPARED BY:

Architectural: Thomas Ellis, AIA   Surveying: Avolis Engineering
Interior: Maxine Baer, NCIDQ   Mechanical: Scott O'Connell, P.E.
Civil: John Moore, P.E.   Electrical: Mike Lally, LEED AP BD+C
Structural: Dennis Claytor, P.E.   Plumbing: Michael Pearce, CPD
Geotechnical: Charles Crawley, P.E.   Fire Protection: Justin Wheeler, P.E.
Telecommunications: Kenny Shultz, P.E.,RCDD,CTS

Final Submission
20 November 2015

REQUEST FOR PROPOSAL APPROVED BY:

Submitted by: Joseph Bovee, AIA
For Commander, NAVFAC MID-ATLANTIC:
Date: November 20, 2015

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Canc: Dec 13

BBul 5090
BEMD
DEC 2 2 2011

BASE BULLETIN 5090

From: Commanding Officer
To: Distribution List

Subj: OPEN BURNING OF VEGETATIVE DEBRIS

Ref: (a) North Carolina Administrative Code (15A NCAC 2D.1900)
            Open Burning
        (b) BO 11320.1L
        (c) BO 5090.12

1.   Purpose.   To establish environmentally compliant open burning
practices, applicable to land clearing and right-of-way maintenance,
in accordance with references onboard Marine Corps Base (MCB), Camp
Lejeune (CamLej) and to facilitate coordination of land clearing and
right-of-way maintenance open burning activities with State and
Federal regulatory agencies, the Environmental Management Division
(EMD), the Fire and Emergency Services Division (FESD), and those
persons conducting the regulated activities.

2.   Background

    a.   Permissible Open Burning Without a Permit.   Open burning for
land clearing or right-of-way maintenance at temporary burn sites (in
place less than nine months) is permissible if the following
conditions are met:

        (1) Prevailing winds at the time of burning are away from any
area, including public road within 250 feet of the burning as measured
from the edge of the pavement or other roadway surface, which may be
significantly affected by smoke, ash or other air pollutants from the
burning.

        (2) The location of the burning is at least 1,000 feet from a
residential dwelling.   The North Carolina Division of Air Quality
(NCDAQ) Regional Office Supervisor may grant exceptions to the setback
requirements if:

DISTRIBUITON A: Approved for public release; distribution is
unlimited

(a) Signed wavers are obtained from residents of occupied structures within 1,000 feet of the open burning site, or

(b) An air curtain burner, operated in accordance with reference (a), is utilized.

(3) Heavy oils, asphaltic materials such as shingles and other roofing materials, items containing natural or synthetic rubber, or any materials other than plant growth are not burned.

(4) Initial burning must begin between 0800 and 1800, and no combustible material can be added to the fire between 1800 on one day and 0800 of the next day. The NCDAQ Regional Office Supervisor may grant an exception if favorable meteorological conditions exist.

(5) No fires can be started nor can vegetation be added to existing fires when North Carolina Division of Forest Resources (NCDFR) has banned burning for that area.

(6) Burners that have the potential to burn more than 8,100 tons per year may be subject to Title V permitting requirements.

b. Definitions

(1) North Carolina Division of Air Quality. NCDAQ is the North Carolina Environmental Regulatory Agency responsible for protecting and improving outdoor, or ambient, air quality by enforcing State and Federal Air Pollution Regulations, to include open burning.

(2) North Carolina Division of Forest Resources. NCDFR is the North Carolina agency mandated and directed to protect, manage and develop the forest resources of the state, and to ensure adequate and quality forest resources for the state to meet present and future needs.

(3) Open Burning. As defined in reference (a), "Open Burning" means the burning of any matter in such a manner that the products of combustion are emitted directly into the atmosphere without passing through a stack, chimney, or permitted air pollution control device.

(4) Land Clearing. As defined in reference (a), "Land Clearing" means the uprooting or clearing of vegetation in connection with construction for buildings, right-of-ways, agricultural, residential, commercial, or industrial development, mining activities, or the initial clearing of vegetation to enhance property value. Land clearing does not include routine maintenance or property clean-up activities.

2

3. Action

   a. Open burning activities aboard MCB CamLej and Marine Corps Air Station, New River (MCAS NR) shall only be conducted for land clearing and right-of-way maintenance in accordance with reference (a).
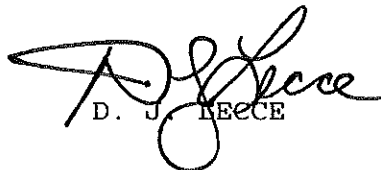
   b. Situations that require regulatory exemption evaluation by the NCDAQ Regional Office Supervisor shall be coordinated through EMD, Environmental Quality Branch (EQB). The point of contact is the Air Quality Program Manager at 451-5068.

   c. Notification of burning activities being conducted in accordance with this base bulletin shall be made to the Camp Lejeune Emergency Consolidated Communications Center (ECCC) at 451-3004 or 451-3005 prior to the ignition. The notification should include the location of the burn, expected duration, and the name of the responsible fire setter. Additionally, at the completion of the burn; the responsible fire setter shall notify the ECCC when the fire is out. The Camp Lejeune ECCC shall notify the FESD and Base Forestry Fire Division of these notifications.

   d. During periods of high wild land fire danger, FESD, in coordination with EMD/Forestry, may recommend to the Base CO that all open burning be temporarily prohibited. If the CO agrees, FESD will notify the Officer-in-Charge of Construction or other appropriate contract officer, that open burning is temporarily prohibited.

   e. Individuals and/or Contractors are responsible for the control of fire and smoke generated by their burning operations.

4. Reserve Applicability. This Bulletin is applicable to MCB CamLej and MCAS NR. This Bulletin is effective the date signed.

D. J. REECE

DISTRIBUTION: A

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Subject: Energy Policy Act of 2005 Implementation and USGBC LEED® Certification

References: (a) Energy Policy Act (EPAct) of 2005 (Public Law 109-58), dated 8 August 2005
(b) Executive Order 13423: Strengthening Federal Environmental, Energy and Transportation Management, dated 24 January 2007
(c) US Green Building Council (USGBC) Leadership in Energy and Environmental Design Green Building Rating System for New Construction (LEED®-NC), Version 2.2, dated October 2005
(d) Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU), dated 24 January 2006
(e) Assistant Secretary of the Navy (Installations and Environment) Memorandum: Energy and Utilities Development in MCON and Special Projects, dated 4 August 2006
(f) American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) Standard 90.1-2004, Energy Standard for Buildings Except Low-Rise Residential

Attachments: (1) Energy Policy Act of 2005 Design and Construction Requirements
(2) MOU High Performance LEED® Credits
(3) Budget Cost for Energy Policy Act of 2005 and LEED® Silver Compliance

Cancelled: Engineering & Construction Bulletin (ECB) 2007-05: Energy Policy Act of 2005 Implementation, dated 26 January 2007

1. Purpose

Provide guidance for complying with the design and construction requirements of the Energy Policy Act (EPAct) of 2005, reference (a), and the Executive Order 13423, reference (b). Additionally, provide guidance on achieving LEED® Silver-level performance and USGBC certification described in reference (c).

2. Background

The EPAct of 2005, reference (a), includes design and construction requirements and energy performance standards for new Federal buildings. The provisions of the Act that affect design and construction are described in attachment (1).

Reference (b) was signed by the President on 24 January 2007. Section 2, paragraph (f), "Goals of Agencies", requires agencies to comply with the Guiding Principles of the Federal

Leadership in High Performance and Sustainable Buildings Memorandum of Understanding, reference (d).

The Assistant Secretary of the Navy (Installations & Environment) (ASN (I&E)) issued reference (e) directing Navy and Marine Corps Commanders, programmers and sponsors to "plan, program and budget for and meet the requirements of the Energy Policy Act of 2005, and policies noted". The memorandum includes a requirement to support achieving at least LEED® Silver-level rating performance.

The use of the LEED® rating system in the planning, design and construction of facilities can address and satisfy the requirements of the EPAct 2005 and the Executive Order. Credits that directly address the Guiding Principles of the 2006 MOU are identified in attachment (2).

Given the reporting requirements of references (a) and (b) there is a need for more accurate and accountable measurement than provided by self-certification. NAVFAC has determined that the USGBC LEED® certification process can provide cost effective assurance of achieving compliance with these requirements.

3. <u>Policy & Implementation</u>

Energy Efficiency
Reference (a) requires that new Federal buildings shall be designed to achieve energy consumption levels that are at least 30 percent below the levels established in the current ASHRAE Standard, reference (f), or the International Energy Conservation Code.

For major renovations where the work exceeds 50 percent of the building's plant replacement value (PRV), the designs shall achieve energy consumption levels that are at least 20 percent below the pre-renovation 2003 baseline if life cycle cost effective.

Water Conservation
For indoor water, after meeting the baseline Energy Policy Act of 1992 fixture performance requirements calculated for the building, employ strategies that use a minimum of 20 percent less potable water.

For outdoor water, employ water efficient landscape and irrigation strategies, including water reuse and recycling, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities).

FY08 Projects
NAVFAC FY08 construction projects have been funded without any programmed amount for compliance with EPAct 2005. Projects with design starts and Request for Proposal (RFP) preparations started on or after 3 January 2007 must comply with EPAct 2005 as codified under US Code 10 CFR 433 & 435, regardless of fund source.

If the project funding or life-cycle cost-effectiveness will not achieve the maximum energy efficiency goal of EPAct 2005, evaluate alternative designs at successive decrements below 30% to the optimal level that is life-cycle cost-effective. Do not decrease scope.

For Navy and Marine Corps projects, follow reference (c) for meeting LEED$_®$ Certified-level rating performance as the minimum goal for applicable projects. USGBC registration and certification of FY08 projects is recommended if attainable without decreasing scope and within allowable funds. To encourage higher levels of performance, include the following in Requests for Proposals:

> Design-Build projects: Include a technical evaluation factor for providing a facility that achieves a LEED$_®$ Silver-level rating performance.

> Design-Bid-Build projects: Include achieving a LEED$_®$ Silver-level rating performance as an additive bid item or option.

FY09 Projects and Beyond
All projects for new buildings and major renovations where the work exceeds 50 percent of the building's plant replacement value (PRV) must comply with EPAct 2005 requirements as codified under US Code 10 CFR 433 & 435, regardless of fund source, building size, location or temporary nature. Projects must also comply with the Executive Order 13423, reference (b). All projects must be registered with USGBC and have the required LEED$_®$ submittal documentation certified by USGBC to meet the required LEED$_®$ Silver-level rating.

Attachment (2) describes LEED$_®$ credits as minimum measures that conform to the Executive Order requirements above. For Navy and Marine Corps projects, follow reference (c) for meeting LEED$_®$ Silver rating, certified by the USGBC as the minimum requirement for new buildings and major renovations where the work exceeds 50 percent of the building's plant replacement value (PRV).

Building systems and features required for meeting the EPAct and sustainable development requirements will be included in the DD 1391, in accordance with guidance provided in attachment (3).

For FY09 MILCON projects, funds have been added to meet the requirements of EPAct, E.O. 13423, registration with USGBC and USGBC LEED$_®$ certification requirements. For new buildings procured by reimbursable, O&M, or funding other than MILCON, ensure there is adequate funding to register the project with USGBC and meet the USGBC LEED$_®$ submittal certification requirements

Scope and funding for FY10 projects and beyond must support the requirements of EPAct, E.O. 13423, registration with USGBC and USGBC LEED$_®$ certification requirements. Requirements will be identified as line items under "EPAct Compliance/LEED$_®$ Silver" in the DD 1391 Budget Estimate Summary Sheet and the total additional cost will be included in the "EPAct Compliance/LEED$_®$ Silver" line item in Box 9 of the DD 1391. For new buildings

procured by reimbursable or Special Project funding, programmers must ensure there is adequate funding to meet the mandatory energy performance levels.

4. <u>Action</u>

This policy and implementation is effective immediately. Changes to criteria documents and NAVFAC standard contract templates to reflect this policy have been implemented. Project managers and contracting officers will ensure that all applicable contracts are in compliance with this guidance.

Capital Improvements will coordinate with the NAVFAC Acquisition Office to address policy issues related to final payment and contractor performance assessments.

This document has been reviewed by Headquarters, U.S. Marine Corps and is fully applicable to all USMC installations.

JOSEPH E. GOTT, P.E.
Chief Engineer and
Director, Capital Improvements
Acting

Attachment (1)

Energy Policy Act 2005 Design and Construction Requirements

EPAct 2005, Section 103- Provide utility meters on all new federal buildings. Paragraph 2-6 of UFC 3-400-01 "Energy Conservation" currently requires metering of each utility serving the building.

EPAct 2005, Section 108 - Use recovered mineral components in concrete (fly ash, blast furnace slag, etc.). NAVFAC complies with this requirement with cement replacement materials and rates currently specified in the Unified Facility Guide Specifications.

EPAct 2005 Section 109 - All new federal buildings with designs started on or after January 3, 2007 must comply with EPAct 2005 Section 109 as codified by DOE under US Code 10 CFR 433 & 435. Specifically, all new federal buildings shall be designed to achieve energy consumption levels that are at least 30 percent below the levels established in the ASHRAE 90.1-2004 standard (for commercial or multi-family high rise buildings) or the 2004 International Energy Conservation Code (IECC, for residential buildings). If a 30% reduction level is not life-cycle cost (LCC) effective, alternative designs must be evaluated to achieve the most energy efficient level that is life-cycle cost-effective for that building.

This section applies to new buildings regardless of location, occupancy, size, funding source, client or temporary nature. Currently, Section 109 requirements do not apply to major renovations. If the 30% reduction level is not life-cycle cost-effective based on the analysis, the Designer of Record (DOR) shall use an iterative procedure, as described in the Rules and Regulations, Federal Register (Vol. 71, No. 232, Department of Energy, Office of Energy Efficiency and Renewable Energy), to find the lowest level of energy consumption that is life-cycle cost-effective. At no time shall the designed energy consumption level exceed the applicable standard: ASHRAE Standard 90.1-2004 or IECC.

EPAct 2005 Section 553- All energy using products or systems procured shall be Energy Star products or FEMP (Federal Energy Management Program) designated products. This affects built in and collateral equipment such as HVAC, lighting, transformers, office equipment, food service equipment, appliances, and all other energy consuming products. NAVFAC presently complies with this requirement through references in Unified Facility Criteria for mechanical and electrical equipment. Ensure these requirements are written into all contract scope of work statements including Category 3 & Category 4 projects.

Attachment (2)

MOU High Performance LEED® Credits

Executive Order: Strengthening Federal Environmental, Energy and Transportation Management, dated 24 January 2007, references the Memorandum of Understanding (MOU) on Federal Leadership in High Performance and Sustainable Buildings. The MOU represents a commitment by 21 federal agencies, including the Department of Defense, to reduce energy demands and employ appropriate sustainable design strategies that are life-cycle cost-effective. Specific goals and measures were identified in the MOU that typically have high return on investment. These goals and measures satisfy the requirements of the Energy Policy Act 2005 (EPAct).

To address requirements for the sustainable design of federal buildings, NAVFAC adopted the use of the USGBC LEED® Green Building Rating System. In Reference (d) direction was given to plan and program to achieve at least a USGBC LEED® Silver-level rating performance, a minimum of 33 LEED® credit points. The LEED® checklist is required on all projects to show credits being sought towards this goal. Include the checklist as an attachment to the Electronic Project Generator (EPG).

By aligning the MOU goals and measures with the LEED® system, 20 - 22 credit points can be achieved towards establishing the LEED® Silver-level rating, and satisfying the requirements of the EPAct. These credits are identified in the table below.

For all applicable projects (new buildings and major renovations where the work exceeds 50 percent of the building's plant replacement value (PRV)), use these credit strategies in meeting the LEED® Silver-level performance.

LEED®-NC version 2.2 Credits

Title	Credit	Number of LEED® Points
Employ Integrated Design Principles	N/A	0 points
Sustainable Sites		
Stormwater Design, Quantity Control	SS 6.1	1 point
Stormwater Design, Quality Control	SS 6.2	1 point
Water Efficiency		
Water Efficient Landscaping, Reduce by 50%	WE 1.1	1 point
Water Use Reduction, 20% Reduction	WE 3.1	1 point
Energy and Atmosphere		
Fundamental Commissioning	EAP	0 points
Optimize Energy Performance, 30% Reduction (EPACT 2005 Section 109)	EA 1	4 points (6 points for major renovations)
Enhanced Refrigerant Management	EA 4	1 point
Measurement and Verification	EA 5	1 point

Attachment (2)

MOU High Performance LEED₍ᵣ₎ Credits

Materials and Resources

Construction Waste Management	MR 2.1	1 point
Recycled Content, 10%	MR 4.1	1 point
Rapidly Renewable Products	MR 6	1 point
Certified Wood	MR 7	1 point

Indoor environmental Quality

Low Emitting Materials	EQ 4	1 point
Thermal Comfort: Design	EQ 7.1	1 point
Daylighting	EQ 8.1	1 point

Innovation and Design Process

Moisture Control Plan	ID 1	1 point
Bio-Based Products	ID 1	1 point
LEED₍ᵣ₎ Accredited Professional	ID 2	1 point

Attachment (3)

Budget Cost for Energy Policy Act 2005 (EPAct) and LEED® Silver Compliance

EPAct 2005 requires energy consumption levels to be 30% less than current ASHRAE 90.1-2004 Standards. The budget to comply with this requirement was not included in FY07/08 projects but is included and detailed in all FY09 projects and should be included in FY10 and later projects.

Studies prepared by Steven Winter & Associates in the spring of 2006 examined three building types (Admin, BQ, & Maint. Fac.) to determine system requirements and costs to comply with the Energy Policy Act 2005. The facilities are located in the Norfolk, VA area (Mid Atlantic mixed-humid climate zone). The studies concluded that the required systems would have additional cost expected to be 1-3% of the Primary Facilities Cost (PFC) depending on the building type. Follow-on studies by Steven Winter & Associates are looking at four additional climate zones for the same three building types. The results from these studies should be available by December 30, 2007, with anticipation that the cost data can be included in the FY10 program as benchmarks.

In FY09 DD 1391 development, describe in the Budget Estimate Summary Sheet (BESS) the additional energy modeling, design studies, systems and features required for compliance with the EPAct 2005 and the Executive Order mandates, each with its own line item and price. Show the delta between the cost of the primary technology and the cost of the technology expected to be used to meet the requirements for EPAct 2005 and LEED® Silver. The documentation is not to show the cost by percentage increases. For the FY09 program, Block 9 of the DD 1391shall include a line item titled "EPAct 2005 & LEED® Silver Compliance". This line will be a summation of all cost deltas associated with the proposed technologies and features identified in the BESS to achieve EPAct 2005 and LEED® Silver compliance goals.

Typical technology types and features used to meet the new requirements include (but are not limited to): 1) High Efficiency Chillers, 2) Premium Efficiency Motors and Transformers, 3) Variable Air Volume (VAV) systems and Variable Speed Drive motors, 4) Occupancy Sensors, 5) Heat Recovery, 6) High Efficiency DX Air Conditioning Units, 7) Solar Water Heating, 8) Solar Walls, 9) Daylighting, 10) High Performance Windows,   11) High Albedo "Cool" Roof, 12) Radiant Heating, 13) Photovoltaic systems, & 14) Green roof.   Appropriate to the climate zone where the project is located, the use of the listed technologies will vary. The project design team will determine the appropriate technology and any others as would be applied to the facility and climate zone.

Note that there are many design features and technologies that will help the project meet the LEED® Silver requirements but normally do not add cost. Those line items do not need to be listed in the BESS, but may be specifically identified in Block 10. Review blocks 10, 11, and 12 for any identified "sustainable" features. List only the major line items.   Block 10 should include the standard Sustainability statement in every project.

Attachment (3)

Budget Cost for Energy Policy Act 2005 (EPAct) and LEED$_®$ Silver Compliance

To check the total cost of the programmed "Inhabited" Building against cost to comply with EPAct 2005 and LEED$_®$ Silver, confirm that the total cost delta is less than 3% of the Primary Facility Cost.

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SECTION 32 17 23.00 30

TRAFFIC CONTROL SIGNS
12/12

PART 1   GENERAL

1.1   REFERENCES

  The publications listed below form a part of this specification to the
  extent referenced. Utilize the latest editions and revisions. The
  publications are referred to in the text by the basic designation only.

FEDERAL SPECIFICATION PUBLICATIONS (FS)

  FF-W-84   Washers, Lock (Spring)

                    Military Specifications (MS)

  DOD-P-21035   Paint, High Zinc Dust Content, Galvanizing
                            Repair

   North Carolina Department of Transportation (NCDOT) Publication:

  NCDOT SSRS   Edition, North Carolina Department of
                            Transportation Standard Specifications for
                            Roads and Structures (English)

            U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

  Color Tolerance Charts   "Color Tolerance Charts"

  MUTCD   Manual of Uniform Traffic Control Devices

     AMERICAN SOCIETY FOR TESTING AND MATERIALS STANDARDS (ASTM)

  ASTM A 123   Zinc (Hot-Galvanized) Coatings on Products
                            Fabricated from Rolled, Pressed and Forged
                            Steel Shapes, Plates, Bars and Strips

  ASTM A 153   Zinc Coated (Hot-Dip) on Iron and Steel
                            Hardware

  ASTM B 209   Aluminum and Aluminum-Alloy Sheet and Plate

  ASTM A 354   Quenched and Tempered Alloy Steel Bolts, Studs
                            and Other Externally Threaded Fasteners

  ASTM A 1011   Standard Specification for Steel, Sheet, and
                            Strip, Hot-Rolled, Carbon, Structural, High-
                            Strength Low-Alloy and High-Strength Low-Alloy
                            with Improved Formability

      ASTM D 4956   Standard Specification for Retroreflective
                          Sheeting for Traffic Control

1.2   SUBMITTALS

Submit the following in accordance with Section 01 33 00, "Submittals."

SD-03 Product Data

    Frangible Sign Post Base; G

SD-07 Certificates

    Sign Supports and Hardware; G

    Signs, Complete Assembly; G

    Manufacturer's Warranty for Reflective Sheeting; G

SD-08 Manufacturer's Instructions

    Frangible Sign Post Base; G

PART 2   PRODUCTS

2.1   SIGN SUPPORTS AND HARDWARE

2.1.1   Steel Posts

Steel posts shall be fabricated from 2 inches and 2-1/4 square steel tubing
conforming to ASTM A 1011, Grade 50, and shall be hot-dip galvanized after
fabrication in compliance with ASTM A 123. Tubing shall be fabricated from
12 gauge steel sheet complete with welded corners. Posts shall be
manufactured with punched or drilled to produce 7/16 inch diameter holes
with a center alignment on each side of the post and spaced one inch apart.
Start holes one inch from the top of the post. Galvanize posts after
fabrication. Repair galvanized coatings in accordance with DOD-P-21035.
Provide sufficient length to permit mounting signs as shown in the MUTCD,
Section 2A.18 and figure 2A-2.

2.2   HARDWARE

2.2.1   Bolts, Nuts and Washers

Provide Hex bolts and nuts for sign mounting applications. Provide
galvanized corner bolts for mounting sign posts to the frangible base
units. Items shall conform to ASTM A 354 and galvanized in accordance with
ASTM ASTM A 153. Nylon or UV stabilized plastic washers suitably colored
to match the sign sheeting color will be provided for mounting the sign to
the post.

2.2.2   Lock Washers

  Items shall conform to FS FF-W-84 and shall be galvanized in accordance
  with ASTM A153.

2.2.3   Shims

 Shims shall be of the same material as the sign panel.

2.2.4   Frangible Sign Post Base

  For each new sign post, provide a Model S200 Snap'n Safe frangible base
  unit as manufactured by Designovations, Incorporated, 7339 Wildwood Road

  Stillman Valley, IL 61084. Provide units appropriately sized for the new
  post. Include "L" shaped mounting bolt hardware with each unit.

2.3   SIGNS, COMPLETE ASSEMBLY

  Signs shall be made from 0.125 inch thick aluminum sheet. The metal shall
  conform to ASTM B 209, alloy G061-T6.

2.4   SIGN REFLECTORIZATION

  Traffic signs shall conform in appearance to MUTCD sign requirements and
  Color Tolerance Charts. Apply reflective sheeting as recommended by the
  manufacturer. Reflectorized sheeting shall be supported by the
  manufacturer's extended warranty as required by NCDOT SSRS, Section 1093-2,
  subparagraph (F). Signs must be fabricated using all of the sheeting
  manufacturer's recommended means and methods that will insure that the
  sheeting manufacturer's warranty will remain in full effect.

  Each sign shall include the original sign identification number placed on
  the back of the sign with an indelible black marker. Each sign shall also
  include a long wearing sign maintenance decal designed for long term
  outdoor use. The decal must have a self-adhesive backing. The Contractor
  shall punch out the installation date, type of sheeting, warranty period
  and anticipated replacement date.

2.4.1   Stop and Yield Signs

  All signs shall be reflectorized with ultra-high intensity micro prismatic
  grade retroreflective sheeting. Reflectorized sheeting shall be adhesive
  backed and conform to ASTM D 4956, Type VIII 3M "diamond grade" prismatic
  sheeting for stop and yield signs. Provide a 12 year sheeting
  Manufacturer's Warranty for Reflective Sheeting.

2.4.2   Regulatory, Warning and Informational Signs

  All signs shall be reflectorized with a high intensity micro prismatic
  grade retroreflective sheeting. Reflectorized sheeting shall be adhesive
  backed and conform to ASTM D 4956, Type III 3M 3930 series sheeting or

approved equal for signs other than stop and yield sign applications.
Provide a 10 year sheeting Manufacturer's Warranty for Reflective Sheeting.

2.5   SIGN MESSAGE

Sign message shall be applied by silk screening or reverse silk screening.
Message fabrication procedures shall be as recommended by the manufacturer
of the reflective sheeting.

PART 3   EXECUTION

3.1   SIGN LOCATION

Height and offsets from the roadway shall be as required by the MUTCD.
When directed by the Contracting Officer, signs shall be relocated to
improve sign visibility or improve vehicle and pedestrian safety. Such
direction shall be provided by stakeout methods using Contractor supplied
stakes. Bid on one stake for each sign. It will be the Contractor's
responsibility to maintain stakeouts until the work is complete. Stakes in
good condition may be salvaged and reused.

3.2   SIGN POST ANCHORAGE IN SOILS

Drive 2 1/4" base post to a minimum depth of 3 feet. Insure base post is
set plumb. Provide a 2" exposure of the base post above finished grade.
Set the Snap'n Safe frangible base on top of the exposed base post and
anchor with 2 "L" shaped mounting bolts. Partial excavations for sign
posts will not be accepted.

3.3   SIGN POST ANCHORAGE IN CONCRETE

Core a 6 inch diameter hole through the island concrete and bituminous
pavement. Drive 2 1/4" base post to a minimum depth of 2.5 feet below the
top of concrete. Insure base post is set plumb. Provide a 2" exposure of
the base post above the top of concrete. Grout around the post with a non
shrink freeze/ thaw resistant grout. Set the Snap'n Safe frangible base on
top of the exposed base post and anchor with 2 "L" shaped mounting bolts.
Anchor new sign assemblies to the new frangible base with 2 "L" shaped
mounting bolts. Trim posts to the length required to meet height
requirements noted above.

3.4   SIGN POST INSTALLATIONS

New posts (and existing posts to be relocated) shall be installed in a
plumb condition. Compact soil around wood posts on all sides while
checking plumb conditions. Check sign heights to insure compliance with
the MUTCD height requirements if the sign is left on the post during the
installation. Adjust sign heights as required to meet the MUTCD.

3.4.1   Sign Installation

  Place new signs or reinstall existing signs with new stainless steel anchor
  bolts, washers and nuts. Protect sign sheeting from damage during
  shipping, storage and handling as damaged sheeting will be rejected upon
  completion of any sign installation. Install signs with a protective
  nylon/ plastic washer to protect the sign sheeting from damage during
  installation and during wind storms. Transfer sign identification markings
  to the back of any new replacement signs. Include the hole punched sign
  management decal on the back of each new sign. Do not install the decal to
  existing signs that will be reused.

3.5   TEMPORARY FLAGGING AND ADVANCE NOTIFICATION SIGNS

  Provide temporary orange flagging with supports and means of anchorage where
  yield signs are changed to stop signs. Provide temporary advance warning
  signs as recommended by the MUTCD, Section 2A.15. Orange flags shall remain
  on the signs for a minimum of six months after the signs have been
  installed. Provide temporary W23-2 advance warning signs indicating a new
  traffic pattern as recommended by the MUTCD, Section 6F.30 for each location
  where a yield sign is replace with a new stop sign.

3.6   SIGN IDENTIFICATION ON AS-BUILT DRAWINGS

  Locate signs for inclusion on the Contractor prepared AutoCAD as-built
  drawings. Sign locations may be collected using GPS surveying techniques.
  Identify signs by MUTCD sign message designations (example: R1-1 for stop
  signs).

  -- End of Section --

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SYNERGY
PUBLIC SAFETY CONSOLES

watson
DISPATCH

SYNERGY

Empower your emergency response personnel to perform at their peak with the console system designed and built with the dispatcher in mind. Synergy consoles combine advanced ergonomics, unmatched structural quality and technology integration into a package that delivers an outstanding return on investment.

DURABLE AND DEPENDABLE

Synergy consoles were designed and manufactured specifically for 24/7 intensive use environments. The consoles are manufactured with superior materials and construction techniques to provide a lasting solution.

FLEXIBLE AND SCALABLE

A broad range of components and sizes are available to customize a console to fit in your facility and support your technology needs.

ROBUST CONSTRUCTION

Synergy consoles feature a rigid unibody construction, solid core panels, heavy-duty extruded posts, and ergonomically-designed height adjustable platforms stress-tested to 40,000 duty cycles, to withstand a decade or more of rigorous use.
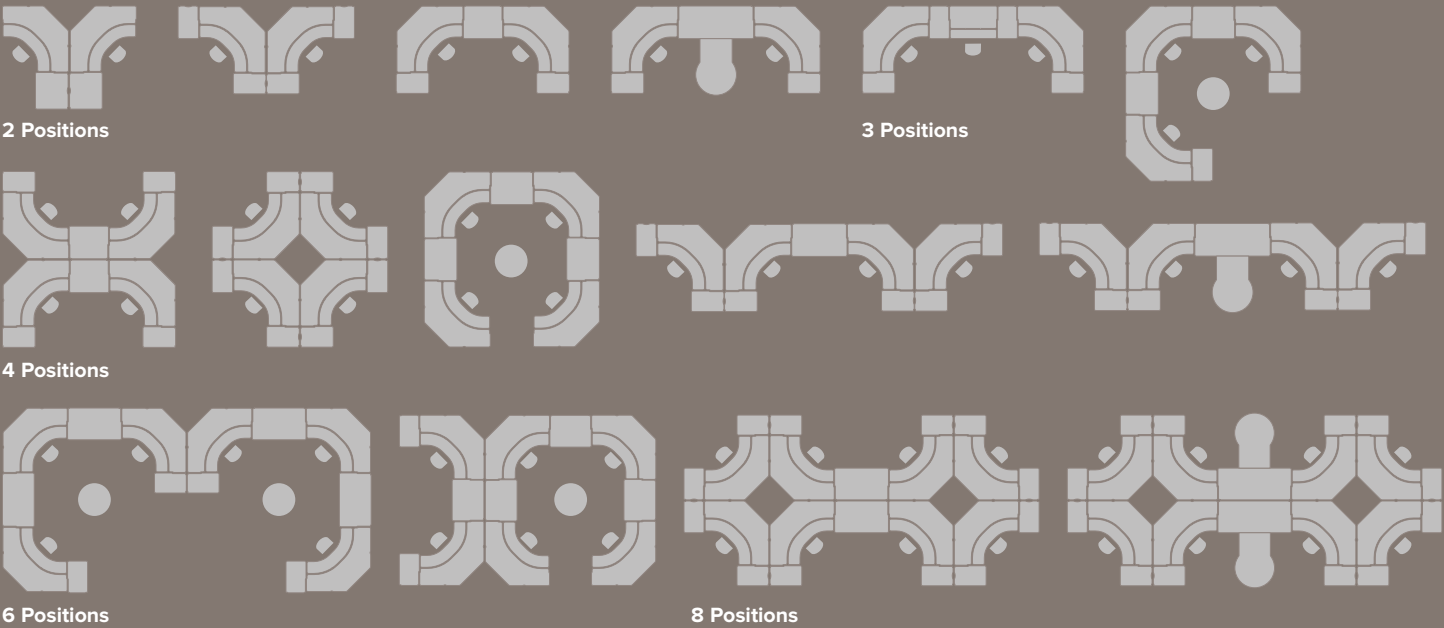
HEIGHT ADJUSTABILITY

Fully adjustable worksurfaces and input platforms adapt to users height preferences and allow for sit-to-stand flexibility from 22 to 57 inches.
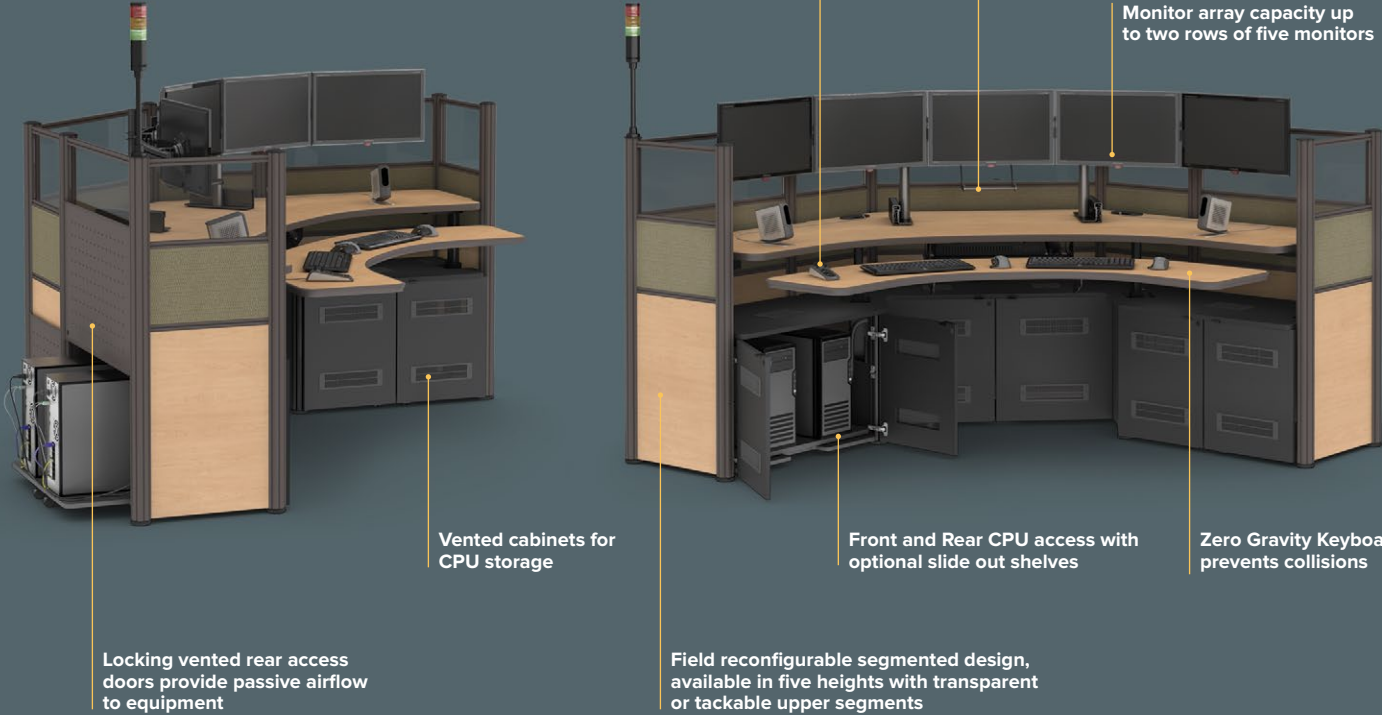
MONITOR DEPTH ADJUSTMENT

For additional ergonomic flexibility, the optional Depth Adjustment Assembly allows for the entire monitor array to move without impacting the worksurface.
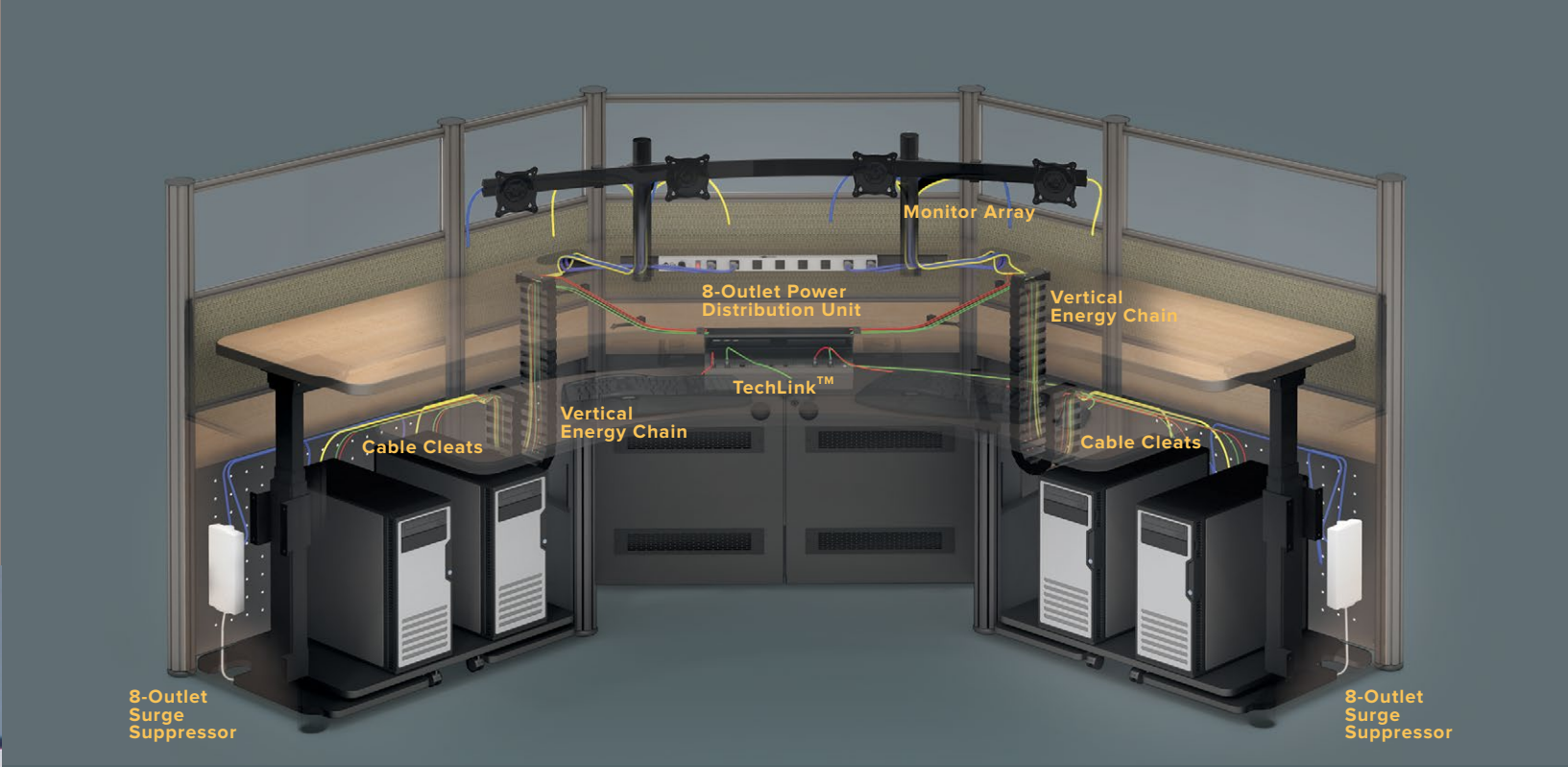
FLEXIBLE PLANNING

2 Positions

3 Positions

4 Positions

6 Positions

8 Positions

DESIGNED FOR 24/7 USE

Total Comfort Controls include airflow, heating, lighting and surface height adjustment.

Optional Depth Adjustment Assembly allows for the entire monitor array to move without impacting the worksurface

Monitor array capacity up to two rows of five monitors

Vented cabinets for CPU storage

Front and Rear CPU access with optional slide out shelves

Zero Gravity Keyboard prevents collisions

Locking vented rear access doors provide passive airflow to equipment

Field reconfigurable segmented design, available in five heights with transparent or tackable upper segments

TECHNOLOGY INTEGRATION

Synergy was designed with tech support in mind. Consoles feature ample room for CPU's with front and/or rear door access to ease maintenance and minimize operator disruption during equipment service and repair. Our exclusive TechLink™ provides quick connection points for keyboard, mouse, phone and other input devices. Synergy cable management features horizontal and vertical pathways to simplify the constant task of managing wires.

Monitor Array

8-Outlet Power Distribution Unit

Vertical Energy Chain

TechLink™

Vertical Energy Chain

Cable Cleats

Cable Cleats

8-Outlet Surge Suppressor

8-Outlet Surge Suppressor

TECHNOLOGY POWER PORTS

(A) 2 Floor to power & data access points

(B) 2 Electrical J-Box mounting points

(C) 4 Eight-outlet surge suppressors

4 Raised floor access points
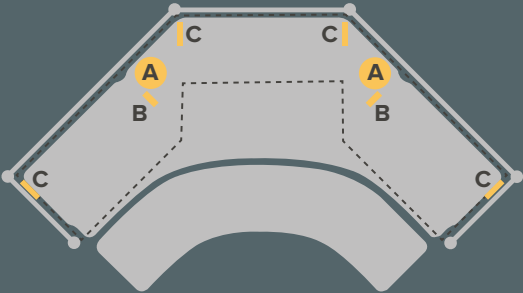
IMPROVED TECHNOLOGY ACCESS

Techlink™ provides easy user connectivity at the work surface for up to 10 input devices, like keyboard and mouse. Wire management is conveniently organized at the rear for tech-access.

TOTAL COMFORT SYSTEM

Watson's Total Comfort System is a single point interface for height adjustment, airflow, heating, and lighting adjustment.

SYNERGY

THREE TYPES OF CONSOLES

Linear

Linear consoles are designed to provide fully height adjustable worksurfaces for back-up and call taker consoles.

Center Lift

Center Lift consoles are specified with fixed bridges to create ancillary surfaces between consoles. The adjustable worksurface supports up to four monitors.
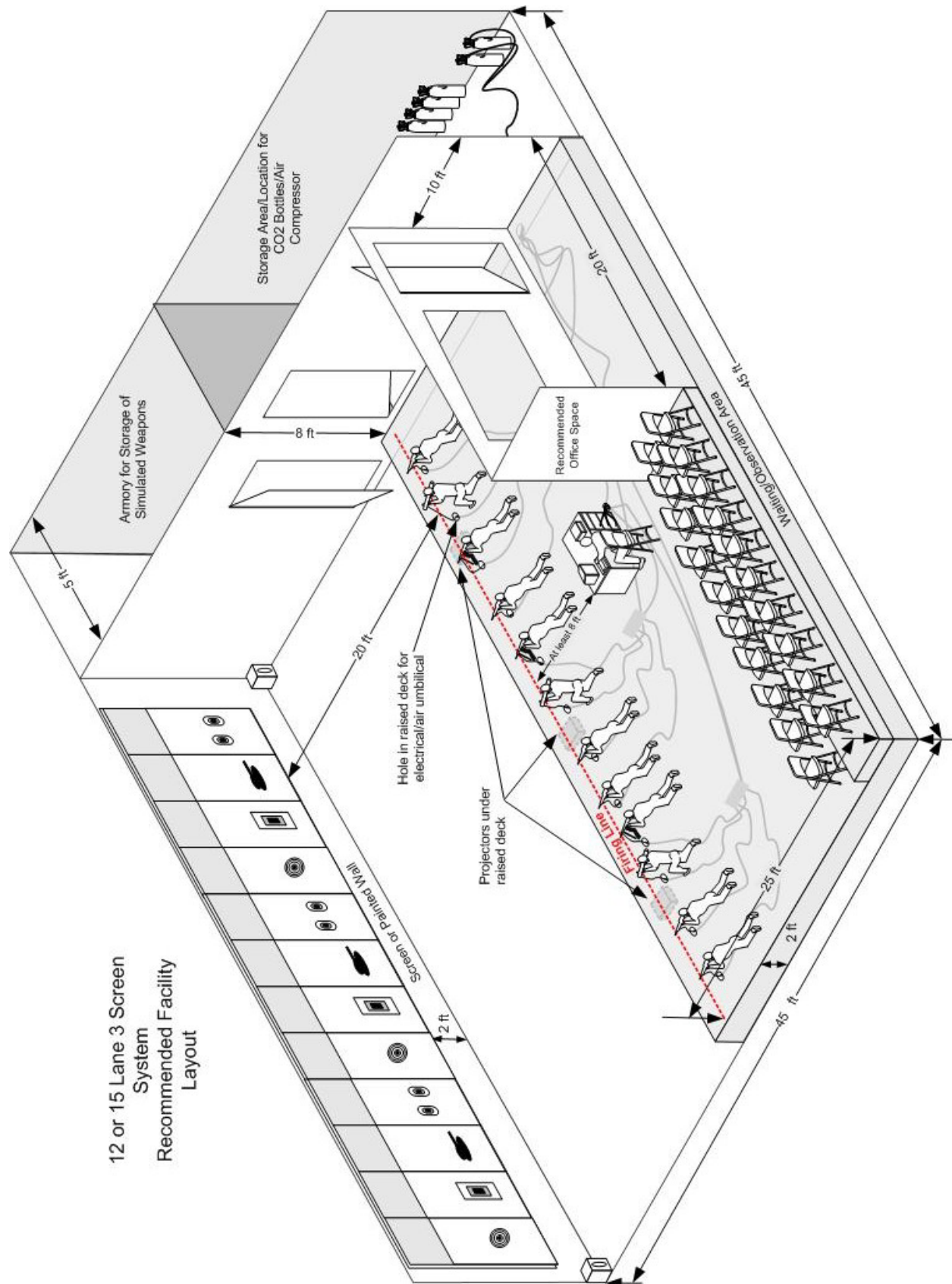
Full Lift

For complete ergonomic control, Full Lift consoles support up to 12 monitors and feature an adjustable worksurface and input platform.

CONSOLE FEATURES

- Three configurations; Linear, Center Lift and Full Lift consoles Fixed & adjustable height surfaces

- Field reconfigurable segmented design, available in five heights with transparent/tackable fabric upper segments

- Single Point Interface used to adjust worksurface and keyboard platform with digital readout, controls airflow, heating and lighting with mobile & scalable fan positioning

- Tools such as personal whiteboards, swivel-to-stow cup holders, paper trays, phone trays, CD trays and binder trays

- Front and Rear CPU access with optional slide out shelves

- Powered keyboard platform

- Locking perforated zero clearance rear access doors provide passive airflow to equipment

- Standard rear access with 8 power outlets per cavity and optional cavity illumination and filtered cavity fans

- Hard surface laminate ends for greater durability

- Primary surface height adjustment range: 27"–52"

- Input platform height adjustment: 22"–57"

watson
DISPATCH

26246 Twelve Trees Lane NW, Poulsbo, Washington 98370
800.426.1202

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12 or 15 Lane 3 Screen System Recommended Facility Layout

Storage Area/Location for CO2 Bottles/Air Compressor

Armory for Storage of Simulated Weapons

Screen or Painted Wall

Hole in raised deck for electrical/air umbilical

Projectors under raised deck

Recommended Office Space

Waiting/Observation Area

Firing Line

| DVC-T	Item	Qty	SIZE	EST SQUARE FOOT
05-047	UXO kit	3	4X8	96
05-041	Placed Mine Trng Kit	10	3X2	60
30-029	Briefcase bomb	10	2X2	40
30-030	OPFOR Bomb vest	15	2X2	60
05-062	IED kit	5	4X2	40
FDG-99-1866	Backpack bomb	25	2X1	75
09-129	Iraqi IED kit	15	4X2	90
30-006	AK-47	50	3	150
30-007	PRK-74	25	3	75
30-018	SVD	20	4	80
30-005	RPG-7	25	4	100
30-14	SA-7 Grail	25	5	125
30-008	PM-50 Soviet pistol	25	1	25
30-011	RGD-5 Grenade	25	1	25
30-004	Suitcase Sagger	10	2	20
07-106	AT-4	30	4	120
30-025	22cal Pistol w/silencer	10	2	20
07-099	Berretta 9mm pistol	20	1	20
07-102	Parry Arm	10	6	60
11-061	Singars radio	15	3	45
23-034	M16A1 AP mine	25	1	25
30-012	RGD-3 Grenade	25	1	25
07-083A	M16A2 Traning Rifles	150	4	600
06-1798	Blue Body Grenades	300	1	10
23-033	M21 AT Trng Mine	25	1	25
	Iraqi wardrobe	50		15
07-096	M-4	75	3	225
07-108	Combat Dummy	20	6X2	240
07-107	Pugil Stick	30	3	90
	Flack Jackets	150	3	450
				3031

Recommended Site Layout

Length 54'

Width 48'

10'

15'

MET

18'

34'

15'

10'
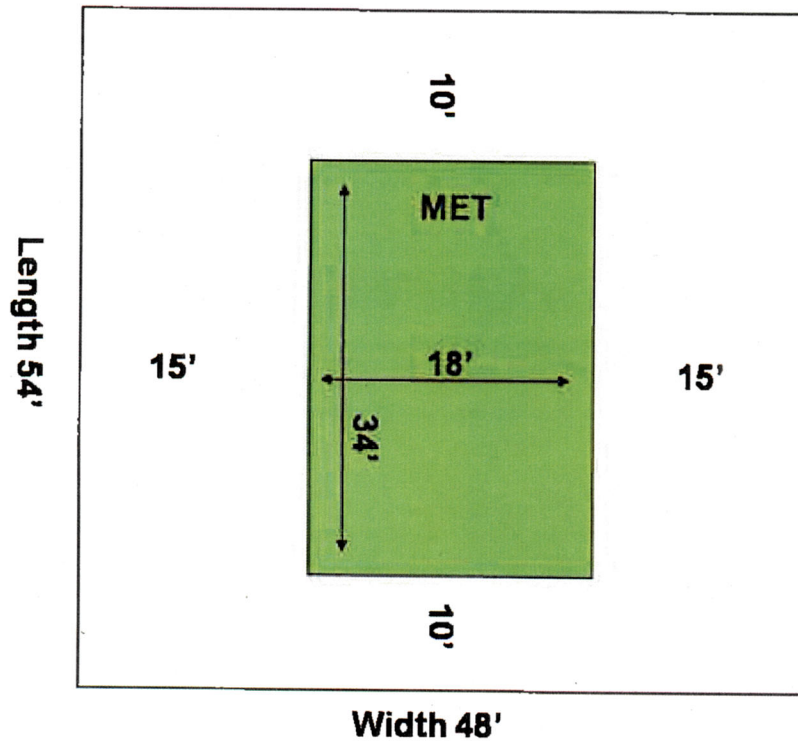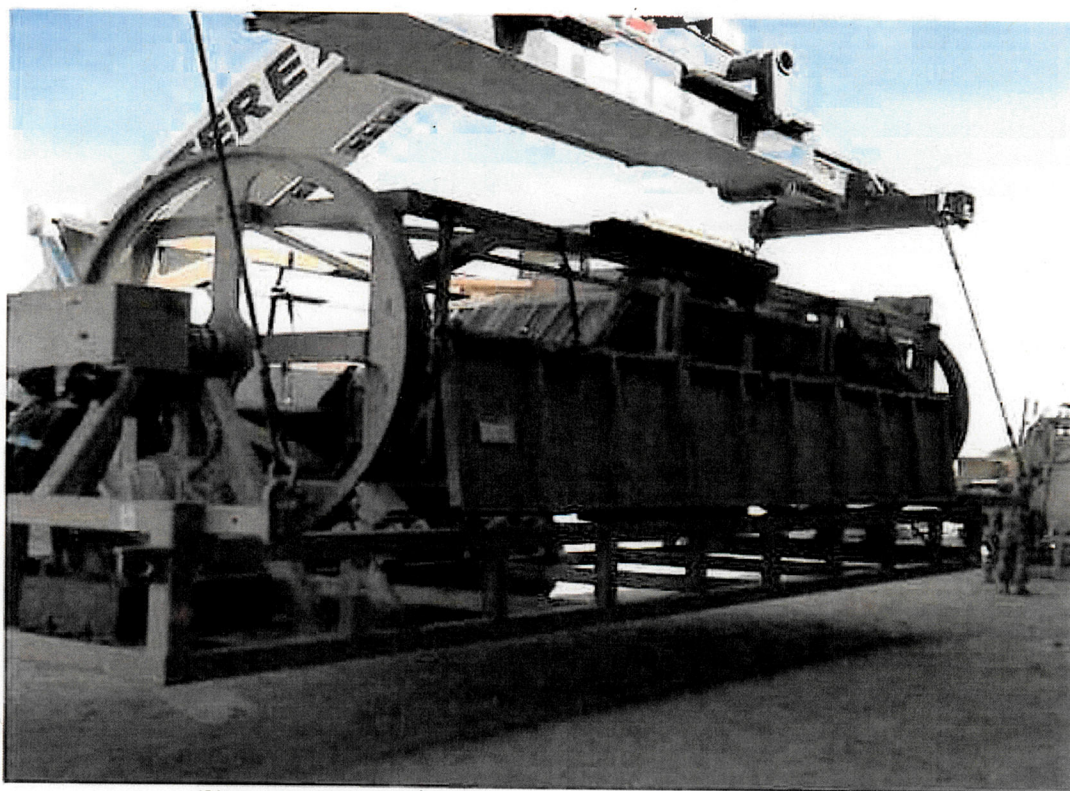
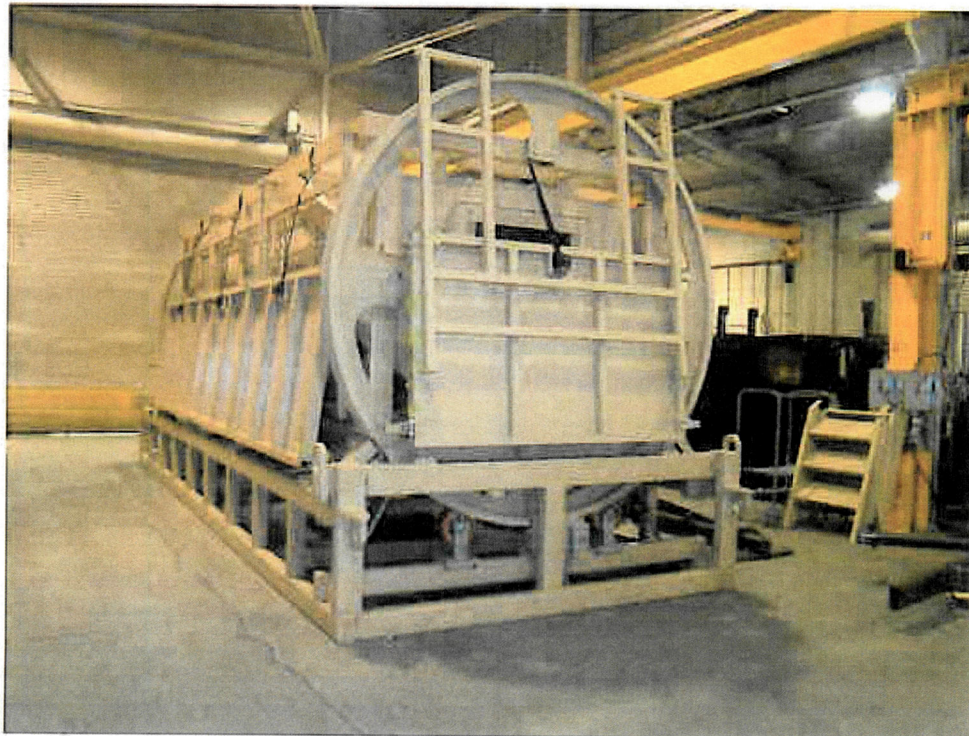Figure 1 - transport configuration. Preferred MHE (TEREX).

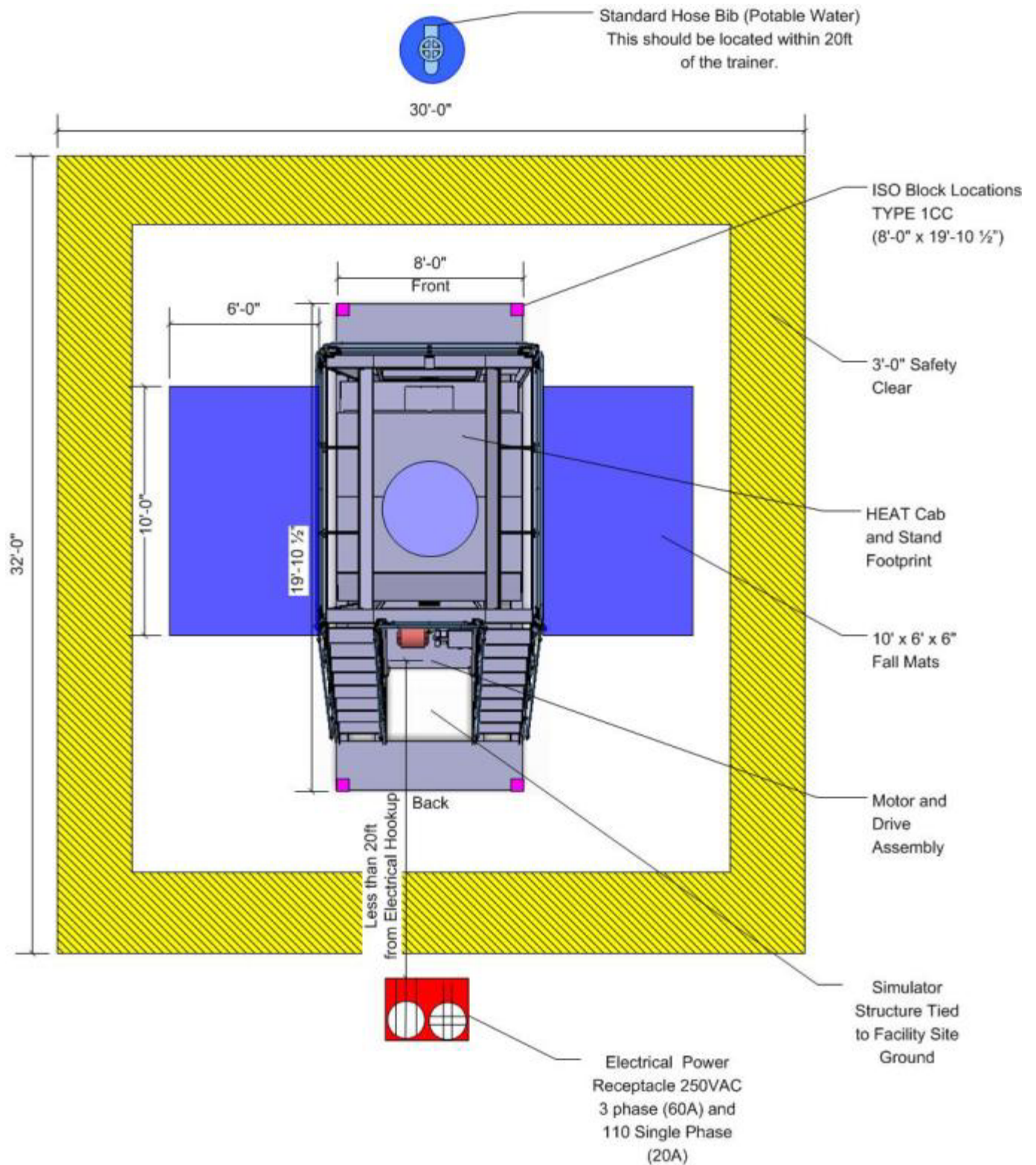FIGURE 2

Figure 4

Figure 5

Figure 5: View looking down of the overall HEAT footprint.

- Okinawa, Japan: Bob Ledyard (robert.r.ledyard@usmc.mil, From US 81988931584
- All others: Hernandez CIV Alex M, alex.m.hernandez@usmc.mil (321)231-6624

c) ***Provide a delivery address*** to the PMTRASYS HEAT project manager Hernandez CIV Alex M, alex.m.hernandez@usmc.mil (321)231-6624 *no less than 15 days prior to scheduled delivery*. The delivery address must include: unit DODACC, Point of Contact (Name, Rank, Billet, commercial phone number, email address), and physical delivery address (i.e. street and building number) and, if applicable, specific base area (i.e. Hospital Point, French Creek, Camp DelMar, Mohave Viper, etc).

d) ***Arrange for and ensure a 10K forklift, ISO castors, ISO Tow Bar, and qualified forklift operator are onsite at delivery*** to safely position the HEAT to its intended location. . The 10K forklift will be required to move the HEAT into the facility. The forklift must be able to clear required doorways and be able to maneuver the HEAT into its intended location (see Figure 2).

e) ***Coordinate with the responsible facility maintenance organization to provide a safe method to secure the HEAT trainer to the foundation. All facility modifications will be the responsibility of the installation.***
1. Recommend ISO castors (rated 5K lbs per castor) be utilized and positioned at the four ISO securing points of the HEAT. This will ease the transfer between the transport truck and the HEAT install location. One potential source of supply is TANDEMLOC (tandemloc.com part# (ST100040T1L000S) for the castors and part# (N25000D-2GA) for the castorlocs.
2. Recommend an ISO Tow Bar be used in conjunction with the ISO castors to ease the transport of the HEAT. Ensure that the 10K forklift is equipped with a pintle hook and has the tow capacity of 10K lbs (most 10K forklifts are equipped with pintle hooks for towing).
3. Recommend the HEAT trainer be secured to the floor with ISO 1161 anchor locks (vertical ISO clamp connectors anchored to the floor). One potential source of supply is TANDEMLOC (tandemloc.com part# (VI-SO)(K08A00A-1GA). Also, recommend 3/4 inch Stainless Trubolt Wedge Type Anchor from Red head or an equivalent manufacture. The part number specified from Redhead is SWW-3454 (http://www.ramset-redhead.com/RH/trubolt_sel_2.asp). See Figure 4.
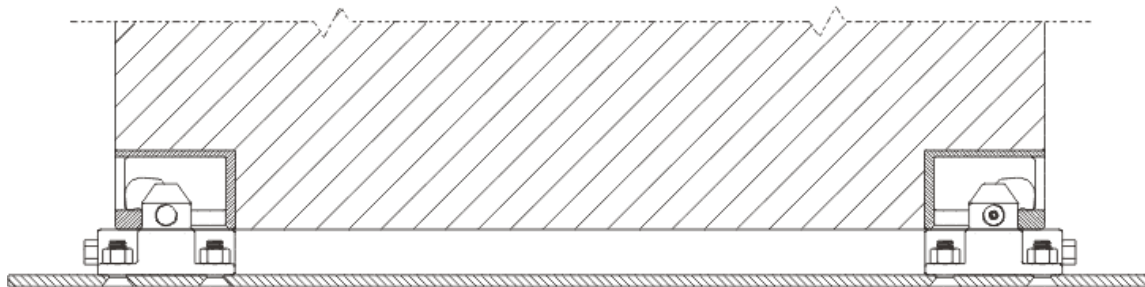

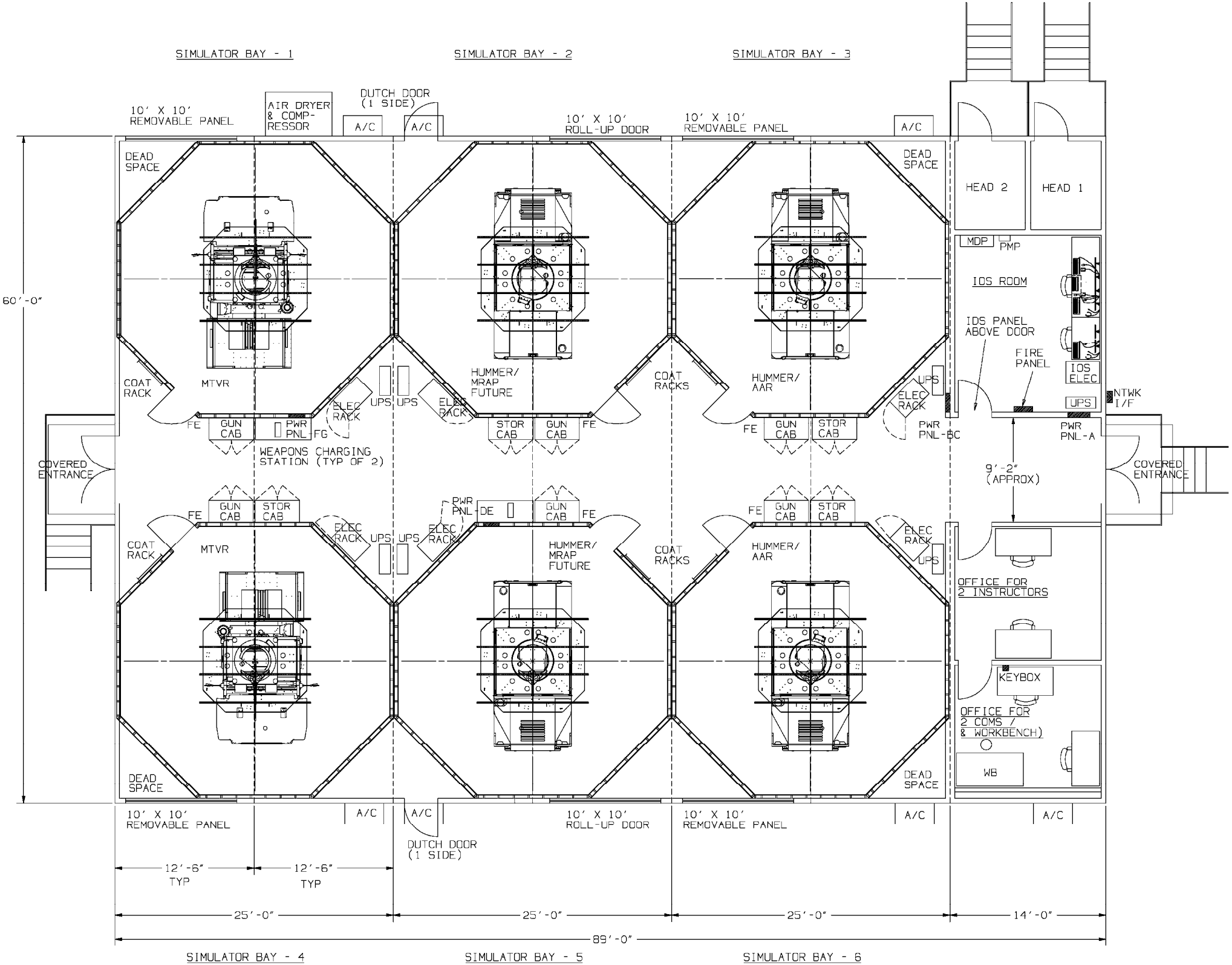*Figure 4: Representation of the vertical ISO clamp installed between the load and floor.*

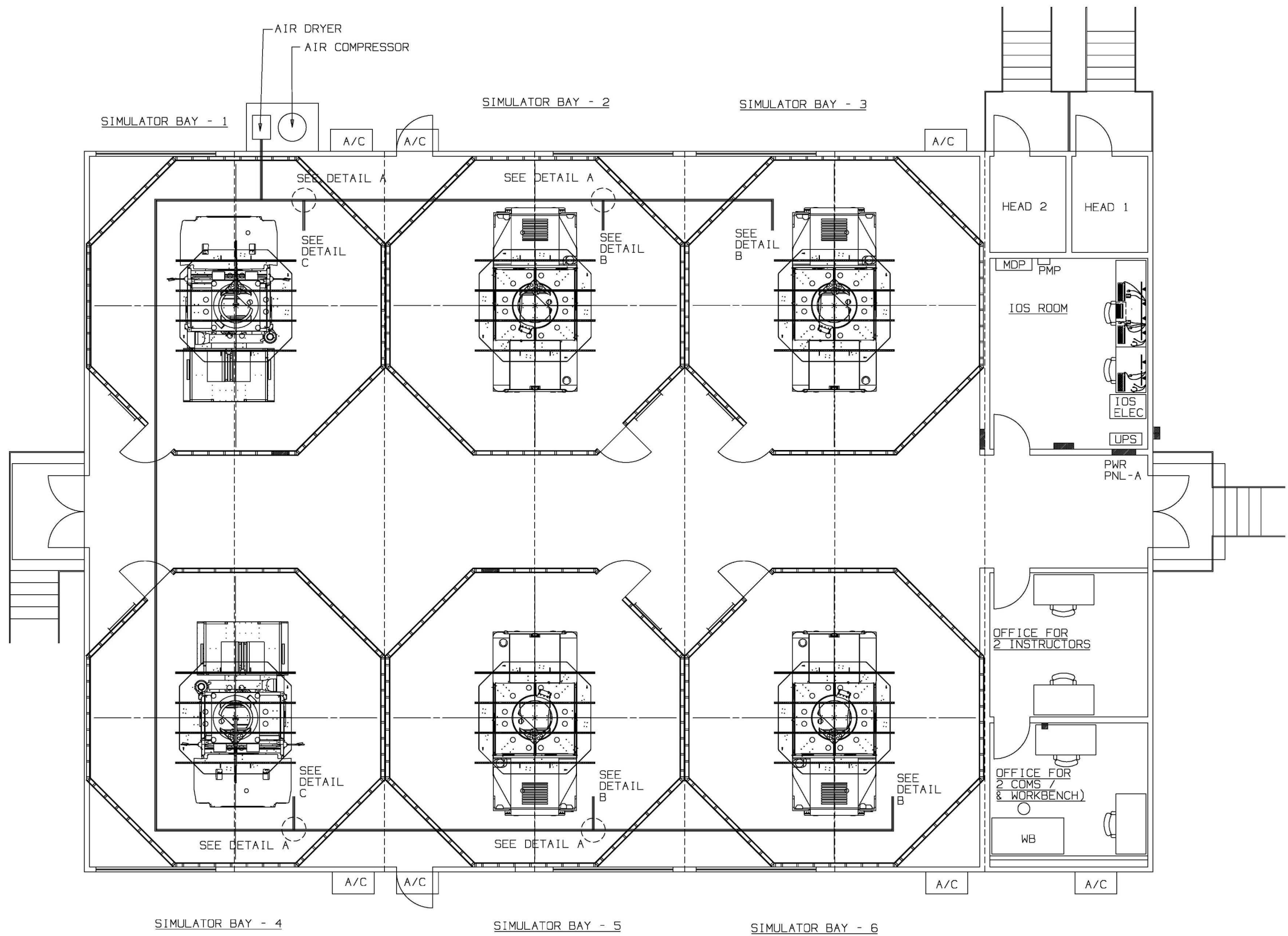*Figure 3.1-1. Modular Facility Plan –*
Phase I Configuration

Figure 5.3.1-1. Air Distribution – Phase I Configuration
(Sheet 1 of 3)

NAMEPLATE 32597

NAMEPLATE 32597

NAMEPLATE 32597

PANEL LAYOUT SIMULATOR BAY 1

PANEL LAYOUT SIMULATOR BAY 2

PANEL LAYOUT SIMULATOR BAY 3

SEE DETAIL B

SEE DETAIL B

SEE DETAIL C

REDUCER COUPLING 3/4 X 3/8 5P932

HYDRAULIC HOSE 8' X 3/8" 4Z218

SEE DETAIL A

SEE DETAIL A

COUPLING 3/4 5P920

REDUCER COUPLING 3/4 X 3/8 5P932

1 1/2" x 1/2" NIPPLE 6P788

125 PSI

3/8" HOSE 5W554 TYPICAL

HOSE BARB 3/8" 5A254

REGULATOR 4ZK93

COMPRESSOR CW7580

HEX BUSHING 3/4 - 1/2 5P882

FILTER 4ZL35

NAMEPLATE 32597

DRYER WA-0020 HOSE 5231K81

NIPPLE 3/8 X 4" 6P776

NAMEPLATE 32597

HOSE BARB 3/8" 5A254

SEE DETAIL A

SEE DETAIL A

PANEL LAYOUT SIMULATOR BAY 4

PANEL LAYOUT SIMULATOR BAY 5

PANEL LAYOUT SIMULATOR BAY 6

NAMEPLATE 32597

NAMEPLATE 32597

NAMEPLATE 32597

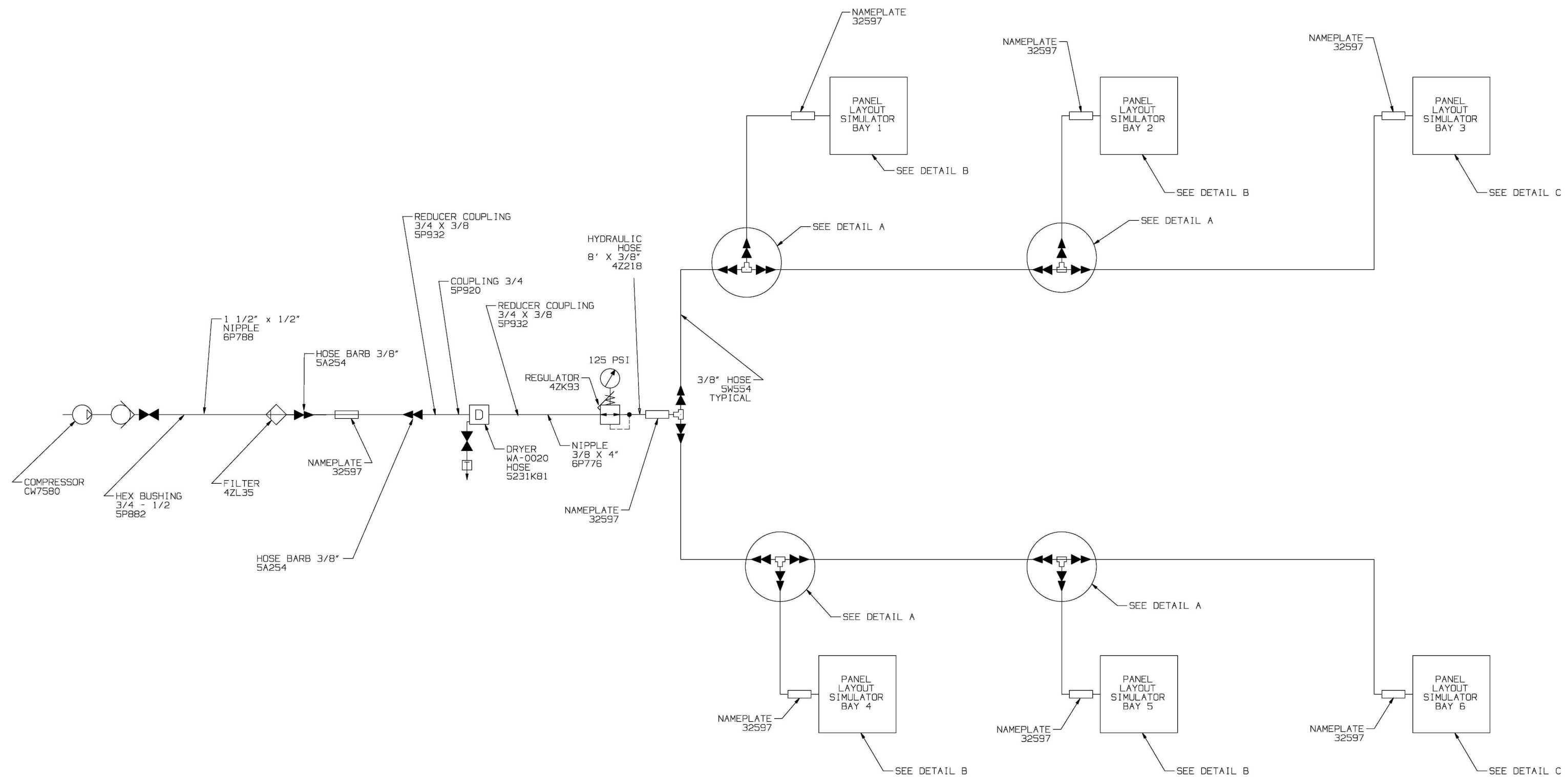SEE DETAIL B

SEE DETAIL B

SEE DETAIL C

Figure 5.3.1-1. Air Distribution – Phase I Configuration
(Sheet 2 of 3)

| FIND NO	PART NUMBER	QTY	DESCRIPTION	VENDOR	CONTACT INFORMATION
1	CW7580	1	COMPRESSOR	COMPRESSOR WORLD	COMPRESSORWORLD.COM
2	WA-C020	1	DRYER	COMPRESSOR WORLD	COMPRESSORWORLD.COM
3	4ZK93	7	REGULATOR	GRAINGER	GRAINGER.COM
4	5W554	2	250' BLACK HOSE, INST-GRIP 3/8"	GRAINGER	GRAINGER.COM
5	5A254	24	HOSE BARB 3/8" X 3/8"	GRAINGER	GRAINGER.COM
6	5P932	1	REDUCER COUPLING 3/4 - 3/8	GRAINGER	GRAINGER.COM
7	5P821	6	3/8" STREET ELBOW	GRAINGER	GRAINGER.COM
8	5MU28	6	3/8" BALL VALVE	GRAINGER	GRAINGER.COM
9	4ZL35	1	FILTER	GRAINGER	GRAINGER.COM
10	4ZK53	1	MOUNTING BRACKET (FILTER)	GRAINGER	GRAINGER.COM
11	4X227	6	1/2" TEFLON TAPE	GRAINGER	GRAINGER.COM
12	4Z218	1	HIGH PRESSURE HOSE 3/8" 96" LONG	GRAINGER	GRAINGER.COM
13	5P882	1	HEX BUSHING 3/4" - 1/2"	GRAINGER	GRAINGER.COM
14	6P788	2	NIPPLE 1/2" X 1.5"	GRAINGER	GRAINGER.COM
15	5P805	1	REDUCING ELBOW 1/2" - 3/8"	GRAINGER	GRAINGER.COM
16	5P808	1	REDUCING ELBOW 3/4" - 3/8"	GRAINGER	GRAINGER.COM
17	5P843	13	TEE 3/8"	GRAINGER	GRAINGER.COM
18	5P804	6	REDUCING ELBOW 3/8 - 1/4	GRAINGER	GRAINGER.COM
19	6P771	15	NIPPLE 3/8 X 1.5"	GRAINGER	GRAINGER.COM
20	6P776	1	NIPPLE 3/8 X 4.0"	GRAINGER	GRAINGER.COM
21	LCD10004HT	6	1/4" COUPLER	COLDER	407-855-7544
22	B52E	6	1/4" COUPLER	PARKER	407-851-3536
23	430	2	3/8" COUPLER	JGB ENTERPRIZES	315-451-2770ZES
24	6P772	6	NIPPLE 3/8 X 2.0"	GRAINGER	GRAINGER.COM
25	5YB80	1	UNISTRUT	GRAINGER	GRAINGER.COM
26	5A250	4	MENDER (SPARES)	GRAINGER	GRAINGER.COM
27	1VHF4	1	FENDER WASHER, 13/64	GRAINGER	GRAINGER.COM
28	1ME38	1	DRILLING SCREW, PK 8	GRAINGER	GRAINGER.COM
29	6XC37	20	HANGER CONDUIT	GRAINGER	GRAINGER.COM
30	2CA48	12	BOLT 1/4 - 20 X 5/8	GRAINGER	GRAINGER.COM
31	2CA61	16	BOLT 1/4 - 20 X 2.25	GRAINGER	GRAINGER.COM
32	2EA20	32	NUT 1/4"	GRAINGER	GRAINGER.COM
33	1JY70	48	WASHER 1/4"	GRAINGER	GRAINGER.COM
34	32597	8	AIR FLOW NAME PLATE	SETON	SETON.COM
35	46715T12	48	DRYER STAND	MCMASTER CARR	MCMASTER.COM
36	5P918	2	COUPLING, 3/8	GRAINGER	GRAINGER.COM
37	6P885	2	NIPPLE 1/2 X 24.0"	GRAINGER	GRAINGER.COM
38	5P798	3	90°ELBOW 1/2	GRAINGER	GRAINGER.COM
39	6P887	1	NIPPLE 1/2 X 36.0"64	GRAINGER	GRAINGER.COM
40	5P981	2	LOCKNUT	GRAINGER	GRAINGER.COM
41	5XC36	2	BUSHING	GRAINGER	GRAINGER.COM
42	6P821	1	NIPPLE	GRAINGER	GRAINGER.COM
43	5P879	1	BUSHING 1/2 X 3/8	GRAINGER	GRAINGER.COM
44	5P958	1	UNION	GRAINGER	GRAINGER.COM
45	6P791	1	NIPPLE 1/2 X 3.0"	GRAINGER	GRAINGER.COM
46	5P807	1	REDUCING ELBOW 3/4 X 1/2	GRAINGER	GRAINGER.COM
47	6P808	1	NIPPLE 3/4 X 3.0"	GRAINGER	GRAINGER.COM
48	5P920	1	COUPLING, 3/4	GRAINGER	GRAINGER.COM
49	5173K67	15'	NYLON TUBING, BLACK 1/4"OD.	MCMASTER CARR	MCMASTER.COM
50	30075T14	6	HANGER, CONDUIT	MCMASTER CARR	MCMASTER.COM
51	30075T29	18	ADAPTER, UNISTRUT MOUNTING	MCMASTER CARR	MCMASTER.COM
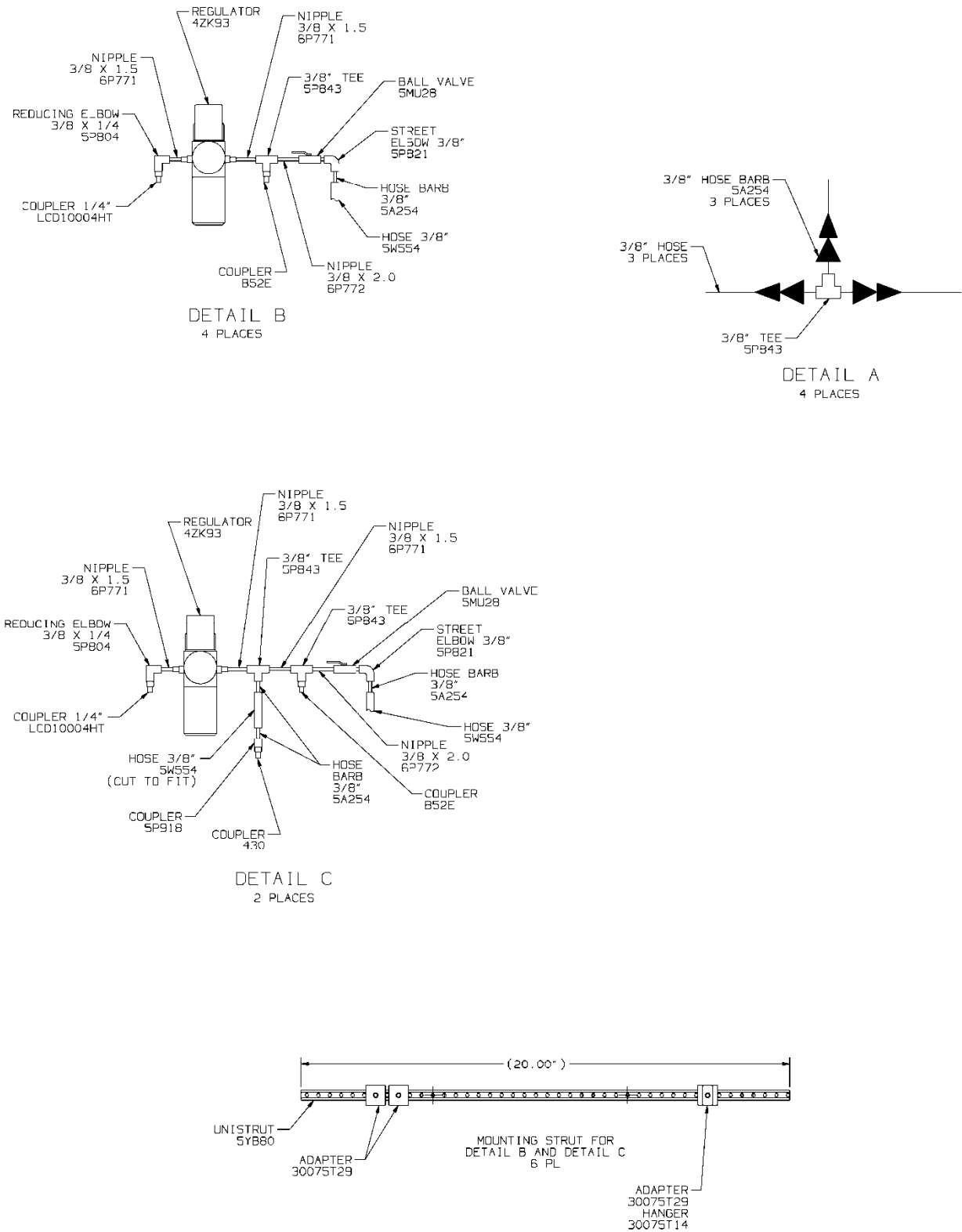
*Figure 5.3.1-1. Air Distribution – Phase I Configuration
(Sheet 3 of 3)*

Table 3.3-1. Trainer Equipment Characteristics

Item	Description	Qty	Wgt. (Lb)	Dimensions (Inches)			Cooling Requirements		Heat Dis (KW)	Power Requirements		Demand Factor	Wiring Over	Under	Remarks
				W	D	H	Type	BTU/ Hr.		KVA @0.9 PF	V, Ph, Wires				
1	HMMWV Crew Cab	4	3500	84.0	187.0	80.0	Room Ambient	2396	0.7	0.78		1.0		X	Powered from UPS
2	MTVR Crew Cab	2	2250	90.0	185.0	92.0	Room Ambient	2396	0.7	0.78		1.0		X	Powered from UPS
3	Electronics Rack	6	750	24.0	39.0	80.0	Room Ambient	7741	2.27	2.52	120/208 VAC, 3Φ, 5W	1.0	X		Plug/Receptacle NEMA L21-30-IG – Powered from UPS
4	Overhead Displays (8)	6 Sets	750	112.0	112.0	24.0	Room Ambient	12901	3.78	4.2					Powered from UPS
5	IOS Console	1	500	133.0	28.0	60.0	Room Ambient	2488	0.73	0.81			X		Plug/Receptacle NEMA 5-20-IG – Powered from UPS
6	IOS Electronics Rack	1	750	24.0	39.0	80.0	Room Ambient	7495	2.2	2.44	120/208 VAC, 3Φ, 5W	1.0	X		Plug/Receptacle NEMA L21-30-IG – Powered from UPS
7	Air Compressor	1	400	36.0	24.0	69.0	Room Ambient	17918	5.25	7.5	208 VAC, 1Φ, 4W	1.0	X		Located outside building
8	Air Dryer	1	85	16.0	16.0	16.0	Room Ambient	1809	0.53	0.75	120 VAC, 1Φ, 3W	1.0	X		Plug/Receptacle NEMA 5-20-IG – Located in Elec Rack Room 1
9	Weapons Cabinet	6	560 (empty)	48.0	24.0	78.0	X	2212	0.65	0.72	120 VAC, 1Φ, 3W	1.0	X		Plug/Receptacle NEMA 5-20-IG – Located in hallway
10	High Pressure Charging Station	2	200	60	30	30	X	X	X	X					
11	UPS	7	352	12	32	32	Room Ambient	3300	0.97		208 VAC, 1Φ, 4W	1.0			Hardwired – 60/2 service Note 1 – Located in Elect Rack/IOS rooms

Site Totals:

	BTU/Hr	KW	KVA
	204,310	59.9	60.82
	See Note 2		

Notes:
1. The UPS powers all of the electronic equipment. See Figure 6.2-1 for details. UPS is 8 KVA
2. The personnel load for the facility is 35 people at 450 BTU/hr each or 15,750 BTU/hr.
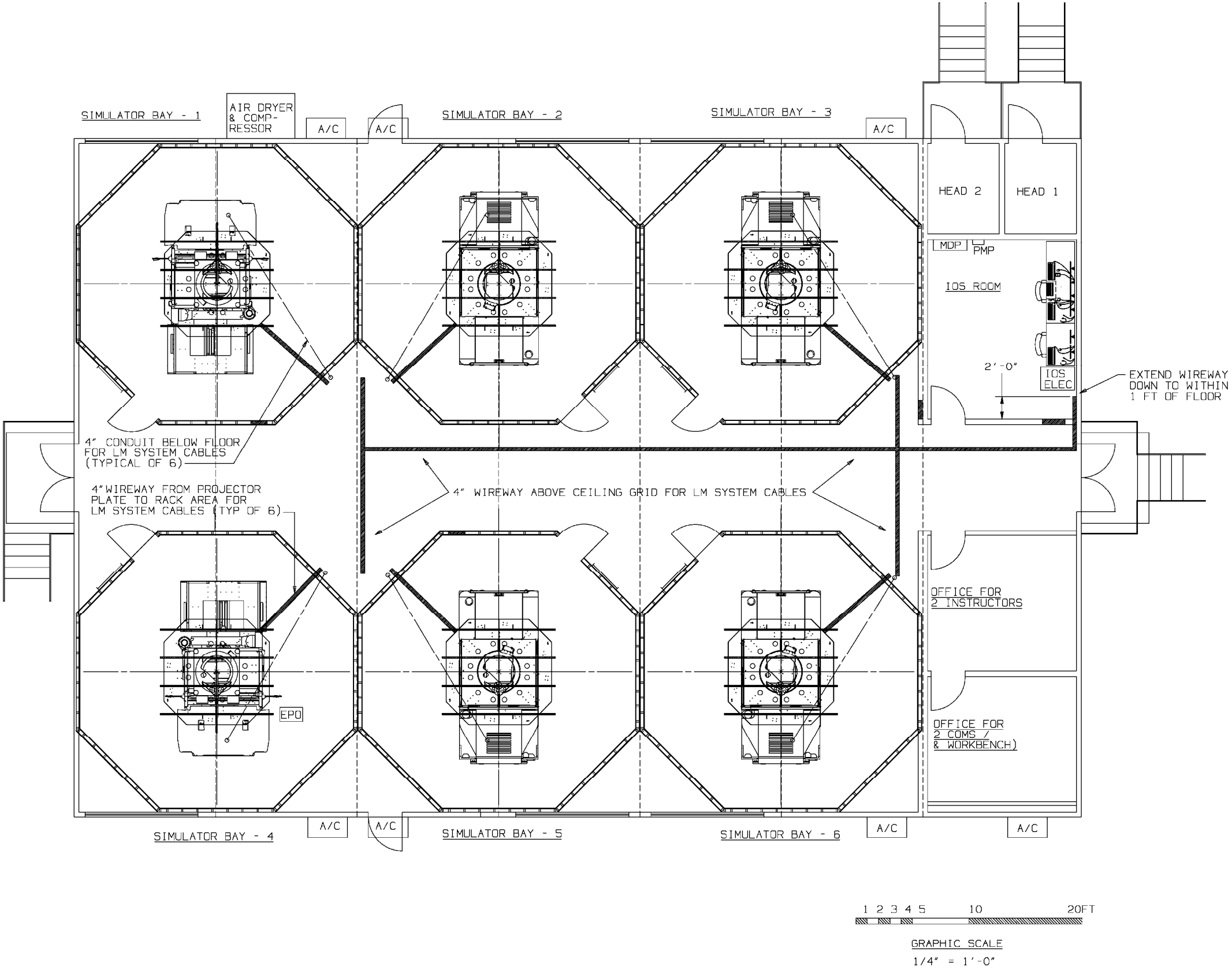
SIMULATOR BAY - 1

AIR DRYER
& COMP-
RESSOR

A/C   A/C

SIMULATOR BAY - 2

SIMULATOR BAY - 3

A/C

HEAD 2   HEAD 1

MDP
PMP

IOS ROOM

2'-0"

IOS
ELEC

EXTEND WIREWAY
DOWN TO WITHIN
1 FT OF FLOOR

4" CONDUIT BELOW FLOOR
FOR LM SYSTEM CABLES
(TYPICAL OF 6)

4" WIREWAY FROM PROJECTOR
PLATE TO RACK AREA FOR
LM SYSTEM CABLES (TYP OF 6)

4" WIREWAY ABOVE CEILING GRID FOR LM SYSTEM CABLES

EPO

OFFICE FOR
2 INSTRUCTORS

OFFICE FOR
2 COMS /
& WORKBENCH)

SIMULATOR BAY - 4

A/C   A/C

SIMULATOR BAY - 5

SIMULATOR BAY - 6

A/C   A/C

1 2 3 4 5   10   20FT

GRAPHIC SCALE
1/4" = 1'-0"

Figure 6.6-1. Modular Facility Wire Management
Plan – "Phase I Configuration"
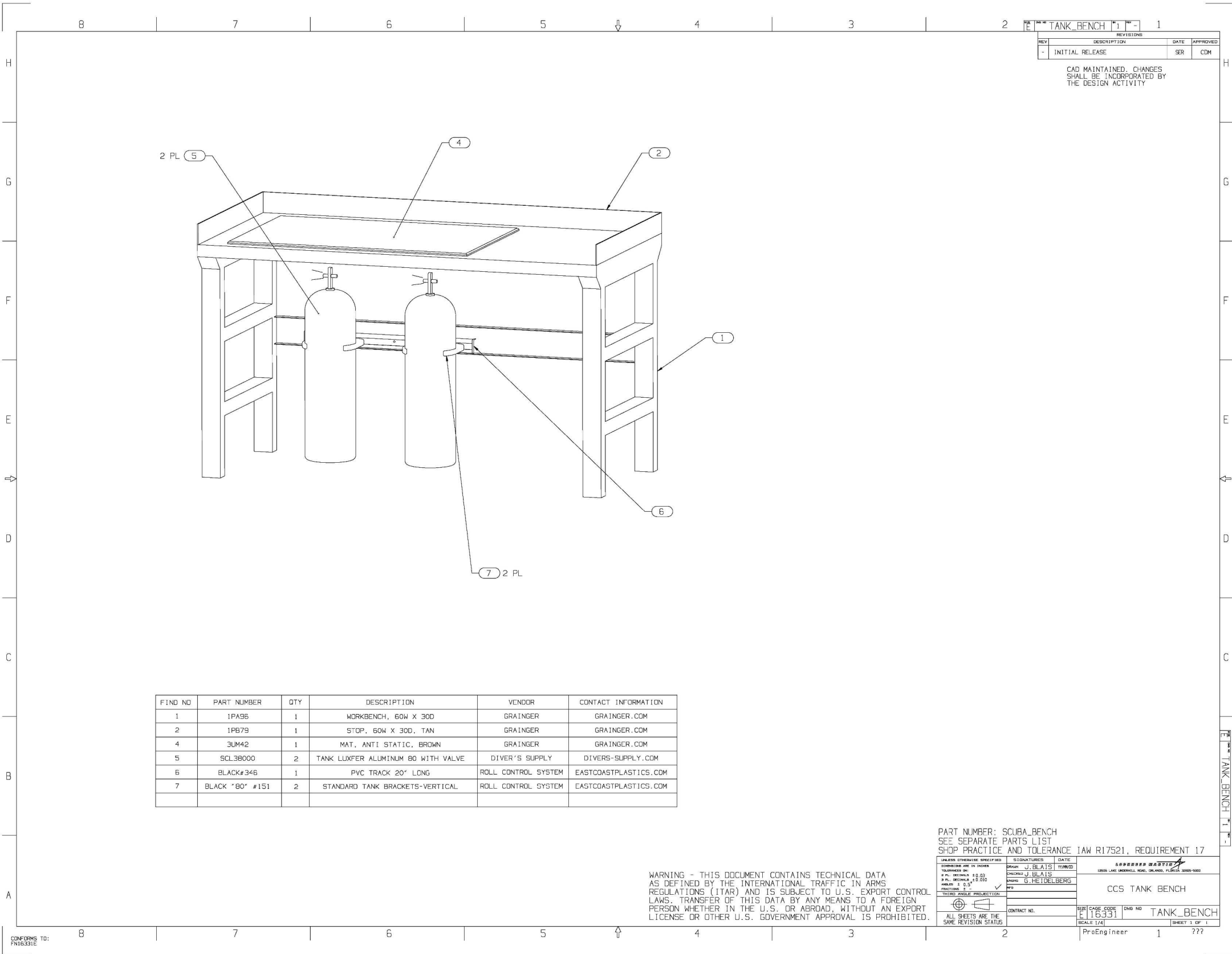
Figure 5.3.2-1. CCS Tank Bench

FIND NO	PART NUMBER	QTY	DESCRIPTION	VENDOR	CONTACT INFORMATION
1	1PA96	1	WORKBENCH, 60W X 30D	GRAINGER	GRAINGER.COM
2	1PB79	1	STOP, 60W X 30D, TAN	GRAINGER	GRAINGER.COM
4	3UM42	1	MAT, ANTI STATIC, BROWN	GRAINGER	GRAINGER.COM
5	SCL3B000	2	TANK LUXFER ALUMINUM 80 WITH VALVE	DIVER'S SUPPLY	DIVERS-SUPPLY.COM
6	BLACK#346	1	PVC TRACK 20" LONG	ROLL CONTROL SYSTEM	EASTCOASTPLASTICS.COM
7	BLACK "80" #151	2	STANDARD TANK BRACKETS-VERTICAL	ROLL CONTROL SYSTEM	EASTCOASTPLASTICS.COM

PART NUMBER: SCUBA_BENCH
SEE SEPARATE PARTS LIST
SHOP PRACTICE AND TOLERANCE IAW R17521, REQUIREMENT 17

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CCS TANK BENCH

TANK_BENCH

Figure 6.9-1. CCS Ground Scheme (Runs parallel with Power Distribution)
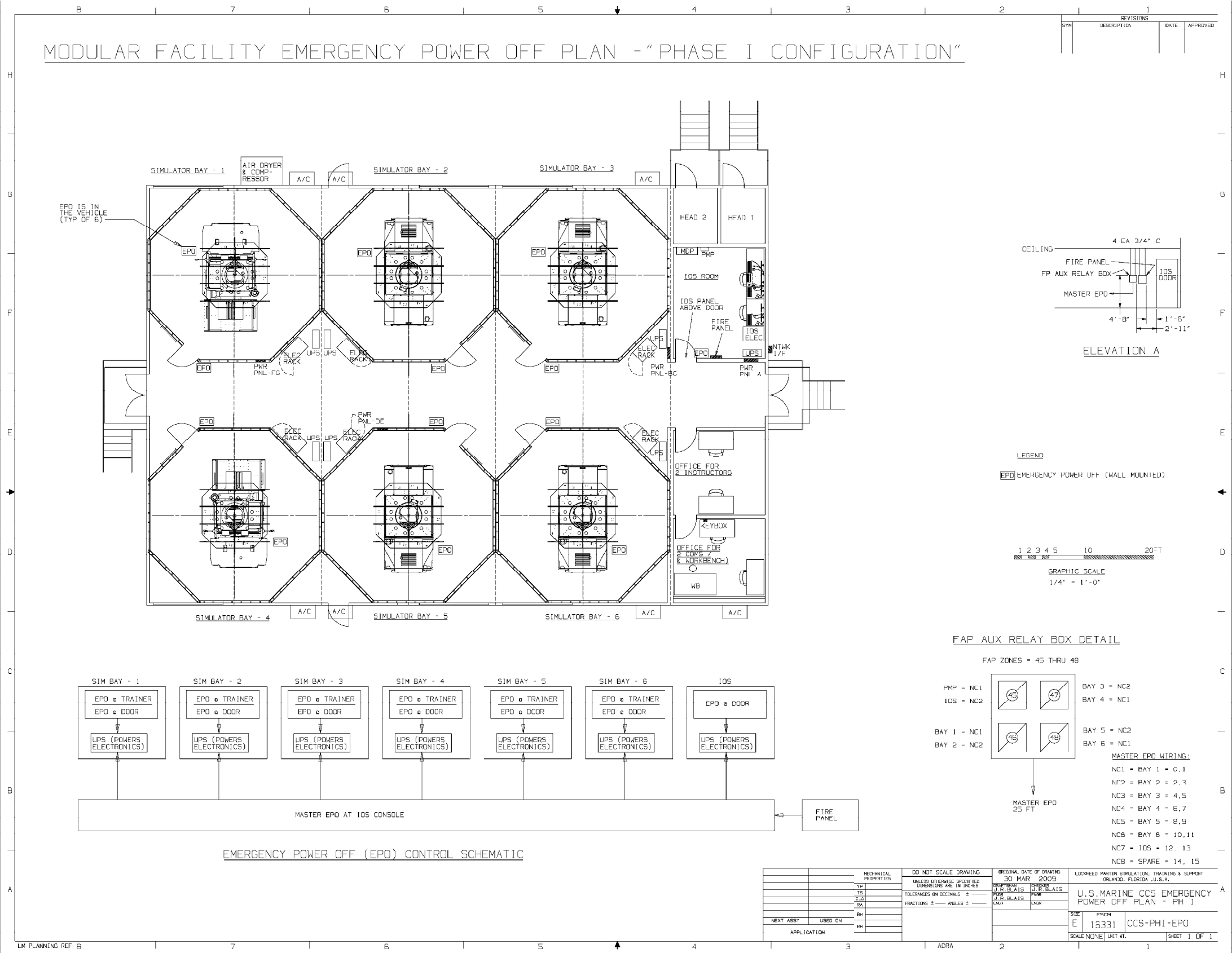
Figure 6.7-1. Modular Facility Emergency Power Off Plan – "Phase I Configuration"

CCS EPO System
Electrical Design

PL is in IFS: 6404609G1

1	88760	18AWG Stranded Wire, TP SHLD, Fire Res, RED	~1600 FT Actual (2000 FT proposed)
2	R17523P1	Markers, Heat Shrink	68 PC
3	7949K31	Butt Splice 22-18awg	40 pc (ADD 10 SPARE) Mcmaster.com
4	M23053/5-106-9	HEAT SHRINK FOR 18AWG TP (FLOAT GND)	2 FT
5	M83519/2-4 & /1-5	SPLICE FOR #18TP	6 & 1
6	MS25036-103	LUG FOR CGND	1 PC
7	M81044/9-20-9	#22 SINGLE WIRE	2 FT

IOS Room

FACP

Master EPO

Sim Bay 6 — 100ft Round Trip From Bay to IOS — 30ft one way

Sim Bay 5 — 120ft Round Trip From Bay to IOS — 30ft one way

Sim Bay 4 — 150ft Round Trip From Bay to IOS — 30ft one way

Sim Bay 3 — 100ft Round Trip From Bay to IOS — 30ft one way

Sim Bay 2 — 140ft Round Trip From Bay to IOS — 30ft one way

Sim BAY 1

TRAINER

Trainer EPO

WAGO TB

TRAINER, SS RACK, & VIDEO DISPLAYS

UPS PWR — REPO

60ft — 40ft — B10 S1

160ft Round Trip From Bay to IOS — 30ft one way

6 Markers per Bay

■ = Marker

HMMWV WAGO TB

TB50-A	TB50-D
TB51-A	TB51-D

MTVR WAGO TB

TB53-A	TB53-D
TB54-A	TB54-D

BUTT SPLICE

IOS Room   (CONNECTION BY OTHERS)

(32 Markers in IOS Room)

IOS/AAR STN & IOS/AAR RACK

UPS PWR — REPO

IOS S1 — 10ft

FIGURE 2. SHORE POWER RACK

J:\Civil Projects\1470 CAMP LEJEUNE\dwg\C-2.dwg, 7/30/2007 9:54:54 AM

NOTE: SKETCH SHOWN FOR TWO UNITS, THREE UNITS ARE IN THE PROJECT.
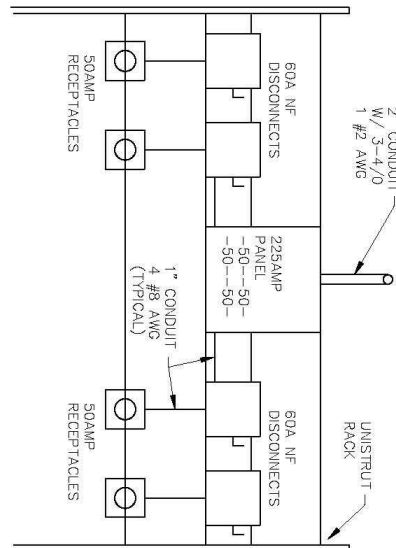
SHORE POWER DIAGRAM
NO SCALE

DESIGNERS
Vanston/O'Brien, Inc.
BUILDERS

2375 Bishop Circle West   Tel: (734) 424-0661
Dexter, MI 48130   Fax: (734) 424-0677
e-mail: sales@vanston.com ◆ www.vanston.com

CAMP LEJEUNE

Onslow County
North Carolina

C-2
SHEET NO.

SHORE POWER DIAGRAM

DRAWN BY: GAH
JOB NO.:   1470

ISSUED FOR:
APPROVAL:

DATE:
7/24/07

Table 2-1. Equipment Weights and Dimensions.

Description	Quantity Supplied	Depth Inches	Width Inches	Height Inches	Weight Pounds
Sony SXRD SRX-T105 Projector	3	52.6"	29.8"	19.8"	265 excluding optional lamps and lens
IOS, Student Station & Briefing Room Computers	12	17.6"	6.8"	18.4"	39
IG Rack Assembly	1	35.5"	23.7"	64"	~400
20" LCD Monitors	5	17.5"	7.6"	14.5"	11.5
16 Port Ethernet Switch	3	8.2"	13"	1.7"	3.27
VGA KVM	2	6"	17"	1.75"	5.9
KVM Extender (LU & RU)	2	1.275"	5"	4.25"	0.45
STIM	1	17.25"	17"	2.25"	12.0
NVIS Bino SX	1	10"	11"	3.5"	2.0
NVIS Monoscope SX	1	6"	8.38"	3.5"	1.0
DVI Splitter	2	4.15"	3.22"	1.0"	1.0
DVI Boosters	2	2.38"	2.18"	0.8"	0.3
RGB MediaWall 1500	1	18"	19"	3.5"	23
B&W Camera	1	7.6"	2.25"	1.75"	1.2
Dome Audio System	1	28"	21"	17.5"	53
Briefing speakers	4	10.25"	10.25"	4.0"	10.5
46" Briefing Monitor	1	27.7"	43.8"	3.13"	109
Projector Screens	2	6.5"	120"	6.5"	54
Lilliput Monitor	4	1.57"	8.07"	6.41"	1.8
Joystick	4	7.75"	7.75"	8"	1.75
NVIS Bino SX Video Control Unit	1	10"	11"	3.5"	3.2
NVIS Monocular Video Control Unit	1	6"	8.38"	3.5"	1.4
Maintenance Keypad Display	1	4.88"	6.88"	2"	0.8
Comp Video Amplifier	1	15.3"	19"	1.75"	14
Optoma Projector	2	11.5"	16"	5"	9
Audio Amplifier	1	9.5"	19"	1.75"	13.2
Audio Mixer	1	4.38"	4.25"	1.75"	2.3
Alignment Camera	2	5.1"	3.4"	2.4"	1.5

Table 2-1. Equipment Weights and Dimensions. (Cont.)

Description	Quantity Supplied	Depth Inches	Width Inches	Height Inches	Weight Pounds
UBox	3	9.8"	8.2"	1"	1.28
Colorimeter	1	7.9"	3.1"	3.1"	3.3
UPS	1	32.7"	56.7"	71"	4550

2.4.   Mechanical

Refer to Appendix D of this document for mechanical plan illustrations. Mechanical plans for SAVT include Heating, Ventilation, and Air Conditioning (HVAC) location and environmental limits, equipment cooling requirements, personnel heat loads to be dissipated, plumbing and drainage requirements, piping and fire protection.

2.4.1.   HVAC System

The facility will be provided with heating, ventilating and air conditioning (HVAC) systems for all rooms within the building and trailer. The HVAC system will be sized to sufficiently cool all the equipment and personnel identified in Table 2-2, including the solar loading for the area. The HVAC system will provide:

    a. Occupant comfort
    b. Indoor air quality
    c. Acceptable noise levels
    d. Energy efficiency
    e. Reliable operation
    f. Ease of maintenance.

Table 2-2. Heat Loading List.

# of Units	Equipment	Description	Heat Load (BTUs/Hour)
Projection Display & IOS Area			
3	Video Projectors	Video projector Sony SXRD (SRX-T105)	2,9825
1	Binocular/LRF Display	Binocular simulation/Laser Rangefinder display	85
1	LTD Display	Laser Target Designator Display	41
2	KVM extender	From FO % FAC CPU's to IOS KVM	37
2	DVI Booster	From IG#8 to GLID VCU to high	34
1	DVI Splitter	For connecting multiple DVI displays to a single source	68
1	STIM	Student Trainee Interface Module	123
6	Computers	IOS, Host, DVTE, JSAF, Stealth, Instructor Computers	7682
4	Monitors	20" LCD Monitors	956
1	KVM Switch	Keyboard/Mouse/Monitor Switch for Multiple Computer Control	31
2	Computers	Voice Recognition & Radio Comm S/W Computers	2561
2	16 Port Ethernet Switch	Ethernet switch for IOS Station, Projector, and Network	99
4	LCD Touchsreen	For Operator, Instructor, and Trainees	1,570
4	Speakers	Powered Speakers for Sound Effects (aircraft, ordinance) (includes subwoofer)	1,707
9	Room Light	8ft surface/pedant mount fluorescent wraparound fixture	3,933
7	Safety light	Recessed wall fixed with blue lamp	597
1	Other light	1'x4' 2-lamp wall mounted fixture with prismatic diffuser	218

Table 2-2. Heat Loading List. (Cont.)

# of Units	Equipment	Description	Heat Load (BTUs/Hour)
Projection Display & IOS Area (Cont.)			
1	Exit Sign	LED exit sign	34
3	Passage way light	4ft surface/pedant mount fluorescent wraparound fixture	655
4	Personnel	Students/Instructor [1]	1,800
		Projection Display & IOS Area Total BTUs/Hour	**52,056.0**
Image Generator Area			
6	Image Generator [2]	PC-IG Channels for Projection System	3,0726
2	Image Generator [2]	PC-IG Channels for Handheld Toolset	5121
1	Mission Computer	PC running application (mission) software	1280
1	Monitors	24" Monitors	376
2	KVM Switch	Keyboard/Mouse/Monitor Switch for Multiple Computer Control	137
1	16 Port Ethernet Switch	Ethernet switches for IGs	99
1	8 Port Ethernet Switch	Ethernet switches for the Sony projectors and filter mechanism	26
1	Black and White printer	Laser printer	1,060
2	Passage way light	4ft surface/pedant mount fluorescent wraparound fixture	437
1	UPS	50KVA UPS for SAVT equipment	33,000
1	Personnel	Students/Instructor [1]	450
		Image Generator Area Total BTUs/Hour	**72,712.0**
		Additional Tons required for Projection Display, IOS, and Image Generator Areas	**10.4**

Table 2-2. Heat Loading List. (Cont.)

# of Units	Equipment	Description	Heat Load (BTUs/Hour)
Secondary Display Area			
2	Projector	Secondary Display	2,936
1	46" Wall Mounted Monitor	Instructor Display	1,021
1	Briefing Computer	Briefing Computer Presentation Use, Includes Office Suite	1,280
3	Computer	JSAF, Stealth, & Instructor Computers	3,841
1	Monitor	20" LCD Monitor	239
2	Projector screen	Motorized screen	864
1	Audio Mixer	Mixes between the computer audio output	6
1	2 CH Audio Amplifier	Amplify audio mix to the ceiling mount speakers	888
1	VGA KVM, 8:1	Keyboard/Mouse/Monitor Switch for Multiple Computer Control	31
1	RGB MediaWall 1500	Allows multiple video inputs to one projector	307
1	Extron 1:2 VGA	One to two analog video splitter	41
1	8 Port Ethernet Switch	Network switch	26
27	Student CPU [3]	Portable Computer	16,131
27	Student Light [3]	Small Work Light	5,531
21	AAR & Office Room Light	2'x4' 2-lamp recessed fluorescent fixture	2,294
1	Bathroom Light	4ft surface/pedant mount fluorescent wraparound fixture	218
2	Bathroom Light	1'x4' 2-lamp wall mounted fixture with prismatic diffuser	437

Table 2-2. Heat Loading List. (Cont.)

# of Units	Equipment	Description	Heat Load (BTUs/Hour)
Secondary Display Area (Cont.)			
2	Exit Sign	LED exit sign	68
30	Personnel	28 Students/2 Instructors [4]	13,500
		Secondary Display Area Total BTUs/Hour	**49,659.0**
		Additional Tons required for Projection Display and Image Generator Areas	**4.1**
		Total BTUs/Hour	**174,427.0**
		Additional Tons required for All Trainer Equipment & Personnel	**14.5**

NOTES *1 Two students, one instructor, and an operator will occupy the projection display area.(~450 BTUs/Hr/person)

*2 Image Generator will consist of one rack-mount PC system

*3 These items may be moved to non-UPS electrical panel

*4 Classroom area to provide for up to 30 persons.(~450 BTUs/Hr/person)

Table 2-3. Electrical Loads.

# of Units	Equipment	Description	Voltage (VAC)	Amps (each)	Amps (total)	Watts (each)	Watts (total)
Projection Display & IOS Area							
3	Video Projectors	Video projector Sony SXRD (SRX-T105)	208	14.00	42.00	2,912.00	8,736.00
1	Binocular/LRF Display	Binocular simulation/Laser Rangefinder display	115	0.22	0.22	25.30	25.30
1	LTD Display	Laser Target Designator Display	115	0.10	0.10	11.50	11.50
2	KVM extender (LU and RU)	From FO and FAC CPUs to IOS KVM	115	0.02	0.04	2.30	4.60
2	DVI Booster	For extending distance of DVI displays	115	0.04	0.08	4.60	9.20
1	DVI Splitter	For connecting multiple DVI displays to a single source	115	0.17	0.17	19.55	19.55
1	STIM	Student Trainee Interface Module	115	0.31	0.31	35.65	35.65
6	Computers	IOS, Host, DVTE, JSAF, Stealth, Instructor Computers	115	6.00	36.00	690.00	4140.00
4	Monitors	20" LCD Monitors	115	0.61	2.40	69.00	276.00
1	KVM Switch	Keyboard/Mouse/Monitor Switch for Multiple Computer Control	115	0.08	0.08	9.20	9.20
2	Computers	Voice Recognition & Radio Comm S/W Computers	115	3.26	6.52	374.90	749.80
2	16 Port Ethernet Switch	Ethernet switch for IOS Station	115	0.25	0.50	28.75	57.50
4	LCD Touchsreen	For Operator, Instructor, and Trainees	115	1.00	4.00	115.00	460.00
4	Speakers	Powered Speakers for Sound Effects (aircraft, ordinance) (includes subwoofer)	115	1.09	4.35	125.12	500.48
2	Rebel EOS Camera	Auto alignment cameras	115	1.5	3.02	173.65	347.30
2	Ubox	USB-to-Ethernet server.	115	2.50	5.00	287.50	575.00

Table 2-3. Electrical Loads. (Cont.)

# of Units	Equipment	Description	Voltage (VAC)	Amps (each)	Amps (total)	Watts (each)	Watts (total)
Projection Display & IOS Area (Cont.)							
1	Black and White printer	Laser printer for class reports, student reports, etc.	115	2.70	2.70	310.50	310.50
Maintenance Equipment							
1	Ubox	USB-to-Ethernet server.	115	2.50	2.50	287.50	287.50
1	Colorimeter	Color alignment for multi-projector system	Powered through USB interface				
		Subtotal for Projection Display Area		**109.99**			**165,55.08**
Image Generator Area							
6	Image Generator	PC-IG Channels for Projection System	115	6.52	39.12	749.80	4,498.80
2	Image Generator	PC-IG Channels for Handheld Toolset	115	6.52	13.04	749.80	1,499.60
1	Mission Computer	PC running application (mission) software	115	3.26	3.26	374.90	374.90
1	Monitor	24" Monitor	115	0.96	0.96	110.40	110.40
2	KVM Switch	Keyboard/Mouse/Monitor Switches for Multiple Computer Control	115	0.17	0.34	19.55	39.10
1	16 Port Ethernet Switch	Ethernet switch for IG	115	0.25	0.25	28.75	28.75
1	8 Port Ethernet Switch	Ethernet switch for projectors & filter mechanism	115	0.07	0.07	8.05	8.05
1	Black and White printer	Laser printer	115	2.70	2.70	310.50	310.50
		Subtotal for Image Generator Area		**59.74**			**6,870.10**

Table 2-3. Electrical Loads. (Cont.)

# of Units	Equipment	Description	Voltage (VAC)	Amps (each)	Amps (total)	Watts (each)	Watts (total)
AAR/Classroom							
2	Projector	Secondary Display	115	2.47	4.94	284.05	568.10
1	46" Wall Mounted Monitor	Instructor Display	115	2.60	2.60	299.00	299.00
1	Briefing Computer	Briefing Computer Presentation Use, Includes Office Suite	115	3.26	3.26	374.90	374.90
3	Computer	JSAF, Stealth, & Standard Computers	115	3.26	9.78	374.90	1,124.70
1	Monitor	20" LCD Monitor	115	0.61	0.61	70.15	70.15
2	Projector screen	Motorized screen	115	1.10	2.20	126.50	253.00
1	Audio Mixer	Mixes between the computer audio output	115	0.02	0.02	1.84	1.84
1	2 CH Audio Amplifier	Amplify audio mix to the ceiling mount speakers	115	2.26	2.26	259.90	259.90
1	VGA KVM, 8:1	Keyboard/Mouse/Monitor Switch for Multiple Computer Control	115	0.08	0.08	9.05	9.05
1	RGB MediaWall 1500	Allows multiple video inputs to one projector	115	.56	0.56	64.40	64.40
1	Extron 1:2 VGA	One to two analog video splitter	115	0.10	0.10	11.96	11.96
1	8 Port Ethernet Switch	Network switch	115	0.07	0.07	7.50	7.50
1	DVI Splitter	For connecting multiple DVI displays to a single source	-	-	-	20.00	20.00
2	UPS	Battery Backup	115	14.00	28.00	1,600.00	3,200.00
Subtotal for Classroom					54.47	3,630.20	6,244.50
Total Amps					196.21		
Total Watts							29,669.68

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Audiovisual Systems Performance Verification Checklist

This checklist is intended to provide owners, consultants and integrators with a comprehensive and verification criteria to determine if the audiovisual system achieves the client's goals or objectives and that the system performs in accordance with the system design. By providing this list to the audiovisual industry, InfoComm is establishing a set of commissioning guidelines to help industry professionals and their clients communicate effectively about their expectations for system performance.

In many projects, not all tests are required for each system or circumstance. Owners and designers can elect to include or exclude certain criteria, as they may not be meaningful for a particular system. In some instances, certain performance capabilities are less critical and therefore stringent review of those capabilities is unnecessary. In other circumstances, certain elements of the system may require more critical review, and the performance of that aspect of the system may need to exceed the general guidelines outlined here. The verification process for each system should be an agreed upon set of tests between the client and the designer.

Project Title _____	**Description** _____
Location _____	**Architect** _____
Designer _____	**Date** _____
Integrator _____	**Client** _____

Audiovisual Systems Verification Tests Checklist

I	AP	Audio Performance
II	VP	Video Performance
III	AVP	Audio/Video Performance
IV	CABL	Cable Management, Termination, and Labeling
V	CON	Control Performance
VI	ELEC	Electrical
VII	IT	Information Technology
VIII	OP	Operational
IX	PHYSE	Physical Environment
X	PHYSI	Physical Installation
XI	SERV	Serviceability
XII	WL	Wireless
XIII	DOC	Documentation

I AP: Audio Performance

All audio performance tests are made from all electronic system inputs (first physical output of source media, all I/O plates, mic inputs) to all electronic system outputs (all outputs connected to amplifier inputs, all connections to external facilities (to other rooms, buildings or external services such as broadcast connections).

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
AP-100	Multi-channel Loudspeaker System Output	Verify that the audio outputs of a multi-channel loudspeaker system are assigned correctly with regards to designated outputs as defined in the project documentation.				
AP-101	Phantom Power	Verify that phantom power is provided at the correct voltage and correct locations as defined in the project documentation.				
AP-102	Loudspeaker Zoning	Verify that loudspeaker zones are wired as defined in the project documentation.				
AP-103	Loudspeaker Impedance	Verify that all loudspeaker circuits have the correct impedance as defined in the project documentation				
AP-104	Audio Signal Transport	Verify that audio signal is being distributed accurately through the system as defined in the project documentation.				
AP-105	DSP Programming	Verify that all DSP-based products have been programmed as defined in the project documentation and that editable, non-compiled source copies of the program have been saved and delivered to owner.				
AP-106	Emergency Muting	Verify that any required muting or operational change of the installed sound system(s) are in accordance with local regulations in the event of a life safety or similar emergency.				
AP-107	Acoustical Ambient Noise	Verify that the background acoustic noise levels within audiovisual spaces are within the required limits as detailed in the project documentation. This test is specifically related to ambient noise levels and not audio system quiescent noise which is tested separately.				
AP-108	Assistive Listening Devices	Verify that all devices that are part of the Assistive Listening System have been tested as a complete end-to-end personal listening system. Verify that the Assistive Listening System complies with regulatory requirements and adheres to project documentation.				

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
AP-109	Alignment of Multiple Audio Source Levels	Verify calibration of permanent audio system inputs so there is minimal difference between any input signal level after the first common gain adjustment.				
AP-110	Speech Reinforcement System Headroom	Verify that audio system is capable of performing above nominal operating levels without distortion, as defined in the project documentation.				
AP-111	Alignment of Microphones	Verify proper alignment, setup, and placement of microphones in the system as defined in the project documentation.				
AP-112	Microphone Level Alignment	Verify calibration of microphones so there is microphone input level alignment as defined in the project documentation between any input signal level after the first common level adjustment.				
AP-113	Microphone Gain Before Feedback	Verify that the speech reinforcement system is operating without feedback and at audio levels as defined in the project documentation.				
AP-114	Conferencing Echo Suppression Performance	Verify that a system with conference capability shall perform at nominal operating levels in a full duplex mode without echo or latency.				
AP-115	Physical Loudspeaker Alignment	Verify that loudspeakers are placed and aimed as defined in the project documentation.				
AP-116	Time Alignment	Verify that all loudspeaker time alignment is configured as defined in the project documentation.				
AP-117	Loudspeaker Polarity	Verify that all loudspeakers are tested to ensure they all have correct polarity as defined in the project documentation.				
AP-118	Loudspeaker Circuit Impedance Measurement	Measure the impedance of all loudspeaker circuits and compare the results with values defined in the project documentation.				
AP-119	Loudspeaker Transformer Tap Setting	Verify the loudspeaker transformer tap setting is in constant voltage systems as defined in the project documentation.				
AP-120	Conferencing Audio Far-Side Level Adjust	Verify that in a conferencing audio application, the incoming audio level from the far-side is checked and adjusted in the system as defined in the project documentation. The far-side audio should come from a verified standard source that provides an audio signal at a level defined in the project documentation. This source should also be used to check all conferencing rooms that will be connected in conference.				
AP-121	Audio System Total Harmonic Distortion	Verify that the total harmonic distortion of the installed audio system is less than the level defined in the project documentation.				
AP-122	Audio Level Exceeds Background Noise Level	Verify that the audio level provided by the AV system exceeds the background noise level as defined in the project documentation.				
AP-123	Audio System Equalization for Spectral Balance	Verify that equalizers have been adjusted in accordance with the preferred acoustic response curves as defined in the project documentation.				
AP-124	Speech Reinforcement System Electronic Frequency Response	Verify that the electronic frequency response of the speech reinforcement system meets or exceeds that which is defined in the project documentation.				
AP-125	Audio Playback System Electronic Frequency Response	Verify that the electronic frequency response of the audio playback system meets or exceeds that which is defined in the project documentation.				
AP-126	Audio Buzz and Rattles	Verify that no audible noise caused by improper installation of any equipment provided in completed system(s) is evident. Perform buzzes and rattles test, monitoring for both direct, or indirect, unintended noise generated as a result of the AV system operating within its designed parameters in the room environment. Noise that may be present as a result of non-AV system related sources (for example, air handler rattles due to excessive volume of air through it) is not in scope with this verification.				
AP-127	Audio System Latency	Measure latency of the audio system, and verify that latency does not exceed requirements defined in the project documentation.				
AP-128	Audio Dynamics	Verify use of audio dynamics, including but not limited to noise compensation, automatic gain control, gating, feedback suppression, compression, limiting, delays, and levelers, and that an editable copy of the program file is provided to the owner.				
AP-129	Sound Masking	Verify that audio system sound pressure levels and equalization is calibrated as defined in the project documentation to provide masking of speech.				

I AP: Audio Performance *(continued)*

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
AP-130	AV Room Reverberation Time	Verify reverberation time and compare to expectations defined in the project documentation.				
AP-131	Audio System Speech Reproduction at Listener Positions	Verify that the audio system provides speech reproduction as defined in the project documentation.				
AP-132	Audio Coverage in Listener Areas	Verify that coverage of the audio systems in listener areas meets the performance requirements as defined in the project as verified by ANSI/INFOCOMM 1M-2009, Audio Coverage Uniformity in Enclosed Listener Areas. Perform separate tests for all independent systems within the project, including but not limited to program sound, speech reinforcement, and show relay. Documented project specific requirements will supersede ANSI/INFOCOMM 1M-2009, however it is strongly recommended that the testing methodology from ANSI/INFOCOMM 1M-2009 be utilized.				
AP-133	Test Audio Routes	Verify that all audio routes are tested from endpoint to endpoint via the appropriate midpoint(s) for operation and routing as defined in the project documentation.				

II VP: Video Performance

All video performance tests are made from all electronic system inputs (first physical output of source media, all I/O plates) to all electronic system outputs (all outputs connected to display inputs, all connections to external facilities (to other rooms, buildings or external services such as broadcast connections).

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
VP-100	Video System Pixel Failure Tolerance	Verify that all displayed images do not have pixel failures (bright or dead pixels) that exceed the requirements of the project documentation or the manufacturers specifications.				
VP-101	Projected Display Physical Alignment	Verify that the combined installation of projector and screen provides a displayed image that is correctly aligned to the active projection screen surface without misalignment unless an alternative condition is specified in the project documentation.				
VP-102	Image Geometry	Verify that all displayed images are correctly focused, have the correct image geometry and are free from distortion (e.g., stretching, keystone, barrel/pincushion). Any requirements for projection mapping or image shaping to unusual surfaces should be validated in accordance with the requirements of the project documentation.				
VP-103	Projected Display Brightness Uniformity	Verify that the combined installation of projector and screen provides a display to the viewer that meets the project requirements for uniformity of brightness across the area of the display.				
VP-104	Image Size Relative to Viewer Position	Verify that the display(s) are sized appropriately to the distance relative to the viewer as defined in the project documentation.				
VP-105	Test Video Routes	Verify that all video routes are tested from endpoint to endpoint via the appropriate midpoint(s) for operation and routing required by the project documentation.				
VP-106	Colorimetry	Verify calibration of all video displays to ensure they display colors uniformly to a common reference standard as defined in the project documentation.				
VP-107	Projected Image Contrast Ratio	Verify that the system should conform to the appropriate viewing category as defined in the project documentation and/or as verified by ANSI/INFOCOMM 3M-2011. Documented project specific requirements will supersede ANSI/INFOCOMM 3M-2011, however it is strongly recommended that the testing methodology from ANSI/INFOCOMM 3M-2011 be utilized. The projected image contrast ratio should be measured for all projected images within the system.				
VP-108	Multiple Resolution Performance of Video Displays	Verify that the system(s) display(s) all resolutions required by project documentation on all displays within the system. Consideration should be given to maximum resolution and aspect ratio of each display to ensure that the anticipated resolutions are within display tolerances of the display devices. Any variation other than accurate display of resolutions should documented in the test report such pixel shift, geometric distortion, artifacts from scaling, letterboxing, pillarboxing, windowboxing, or similar distortion of the image.				
VP-109	EDID Management Plan	Verify that the EDID (Extended Display Idenification Data) management plan has been implemented per the project documentation.				
VP-110	HDCP Management Plan	Verify that the HDCP (High-bandwidth Digital Content Protection) management plan has been implemented per the project documentation.				
VP-111	Video Camera Image and Operation	Inspect camera image quality through the full lens operation. Check lens for proper operation. Check proper operation of pan/tilt operation.				

III AVP: Audio/Video Performance

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
AVP-100	Audio and Video Recording	Verify that audio and video signals are being routed to the recording device and that the recording device is operating correctly, as defined in the project documentation.				
AVP-101	Audio/Video Sync	Verify that audio/video synchronization is maintained to ensure the proper time alignment of signals during playback at the point of user experience or transmission as defined in the project documentation.				
AVP-102	Radio Frequency Television Distribution	Verify that the radio frequency and satellite intermediate frequency distribution systems provide all services to all endpoints as defined in the project documentation.				
AVP-103	Emergency Communications	Verify that emergency communications systems properly receive inputs and information from other systems including but not limited to life safety systems, security systems, and weather notifications, and deliver appropriate notifications to target audiences, comply with regulatory requirements, and adhere to requirements defined in the project documentation.				
AVP-104	Source Testing	Verify that "real life" sources other than test generators have been tested on the completed system using the common communication and/or media types the system is designed to support as defined in the project documentation.				
AVP-105	Genlocking (video synchronization)	Verify that the video synchronization of the system is performing as defined in the project documentation.				

IV CABL: Cable Management, Termination, and Labeling

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
CABL-100	Cable Supports	Verify that all cables are adequately supported throughout their lengths as defined in the project documentation.				
CABL-101	AV Connector Verification	Verify that all cable terminations are made securely and meet the recommendations of the connector and cable manufacturer, published standards, as well as in accordance with requirements defined in the project documentation. Verify that terminations are appropriate for application with correct pin configuration and connection to equipment with a minimum of adaptors.				
CABL-102	Patch Panel Labeling	Verify that all patch panels have been labeled as defined in the project documentation. Verify that all labeling is machine-printed, consistent, durable, accurate, and legible.				
CABL-103	Patch Panel Configuration	Verify that all patch panels have been correctly wired and configured as defined in the project documentation, having regard for connectivity, consistency of phase and normalization.				
CABL-104	AV Equipment Power Cable Management	Verify that all AV equipment power cables are managed as defined in the project documentation. Verify that cables are managed in a uniform and acceptable manor so as not to compromise safety/OEM warranty, AV signal quality, and/or future field service.				
CABL-105	AV Connector Seating	Verify that all connectors are correctly keyed, seated, and latched to respective connection points as defined in the project documentation. Conditions where physical parameters exceed the connector's ability to maintain full seating should be resolved as defined in the project documentation.				
CABL-106	Cables Dressed	Verify that cables are dressed to ensure that all rack and site cables are installed to provide serviceability, safety, and aesthetics as defined in the project documentation.				
CABL-107	AV Connector Plate Input and Output Labeling	Verify all AV connector plate input and output labeling as defined in the project documentation.				
CABL-108	AV System Cable Labeling	Verify that all cables are identified by a unique ID as defined in the project documentation. Verify that this unique ID is displayed permanently at both ends of the cable, is legible, and is positioned where it can be seen without undue disturbance.				
CABL-109	AV Connector Plate Consistent Labeling	Verify that AV connector plates have consistent labeling throughout the project as defined in the project documentation. Verify that all connector plates are given unique identifiers and that this identifier is used as defined in the project documentation. Verify connector plate labeling is consistent with control surfaces. NOTE: Unique identifiers should be permanently marked on finished plates unless there are aesthetic reasons not to.				

IV CABL: Cable Management, Termination, and Labeling *(continued)*

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
CABL-110	Cable Ties	Verify that where appropriate, cable ties are used to secure the cables and that the correct type of cable tie is used in the project as defined in the project documentation.				
CABL-111	Cable Separation	Verify that both site and rack cables have appropriate separation according to signal type and level as defined in the project documentation.				
CABL-112	Cable Length Required For Serviceability	Verify that sufficient cabling is available so the device can be placed in a serviceable location as defined in the project documentation.				
CABL-113	Cable Bend Radius	Verify that cables are not bent beyond their minimum bend radius as specified in cable data sheet in order to maintain signal integrity as defined in the project documentation. Project documentation may state a larger radius to allow for a safety margin.				
CABL-114	Termination Stress	Verify that all cable terminations have been completed and adequately supported so as to minimize weight or stress on the termination point and/or connector.				
CABL-115	Cables Bundled By Type	Verify that cables are only bundled together when their construction, signal type, and signal level are compatible and will not cause measureable crosstalk or interference between cables.				
CABL-116	AV System Cabling Verification	Verify that all cabling is of the correct type and routed correctly from point to point as defined in the project documentation.				

V CON: Control Performance

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
CON-100	System Response to Emergency Condition	Verify that any required response of the installed Audio Visual system(s) in the event of a life safety or similar emergency operates in accordance with local regulations and as defined in the project documentation. This item specifically excludes sound system response to an emergency condition which is covered under item AP-106.				
CON-101	Mobile Device Integration	Verify that mobile devices that are to be supported are integrated and operating as defined in the project documentation.				
CON-102	Control System Communications	Verify that all control communications are tested from endpoint to endpoint via the appropriate midpoint(s) for operation and functionality as defined in the project documentation.				
CON-103	Control System User Interface Performance	Verify that the look and feel of the control system is consistent with requirements as defined in the project documentation. This includes touch screen pages, buttons, navigation, gestures, and all other ways the user will control the system and environment. Verify that the control system provides the user response time and maximum latency as defined in the project documentation.				
CON-104	Control System Automated Functions	Verify that all macro functions executed by the control system conform to requirements as defined in project documentation.				
CON-105	Interfacing and Control of External Devices and Systems	Verify that AV control system interfaces to and controls systems provided by others and conforms to requirements as defined in the project documentation. This may require coordination with other service providers or the owner's support organization.				

VI ELEC: Electrical

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
ELEC-100	AV Equipment Connected to Proper Circuit	Verify that all AV equipment is powered from the designated power circuit and outlet as defined in the project documentation. No additional (non-AV) equipment should be connected unless permitted in the project documentation.				
ELEC-101	Mains Voltage Sub-Distribution Integrity	Verify that all electrical sub-distribution systems provided by the AV contractor in equipment racks, furniture, etc. meet local regulatory requirements for electrical integrity. NOTE: In this context "sub-distribution" refers to localized distribution systems providing power to multiple items of equipment from a single outlet.				

VI ELEC: Electrical *(continued)*

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
ELEC-102	Power Sources	Verify that the sources of mains voltage AC power to be used for the supply of audiovisual equipment are correct per the project documentation and have been tested to the outlet in accordance with local electrical standards.				
ELEC-103	Grounding/Earthing	Verify that all elements of the audiovisual system are correctly bonded to an electrical ground/earth in accordance with the requirements of regulatory authority.				
ELEC-104	Power Sequencing	Verify that the power sequencing of devices is correct per the project documentation.				
ELEC-105	DC Power Distribution	Verify that all DC powered devices are receiving the proper voltage and current for normal operation. When distributing or extending DC power, the total current draw must not exceed the available potential of the power supply.				
ELEC-106	UPS Operation	Verify that the uninterruptible power supply (UPS) is performing to the specifications as defined in the project documentation.				
ELEC-107	Power Loss Recovery	Verify that the audiovisual systems for normal operation on the resumption of power following a hard electrical power outage. Power loss recovery shall include the resumption state on power recovery. Resumption state shall be the control system start up condition/start page (where applicable) and resetting all devices to a known state as defined in the project documentation.				
ELEC-108	Power Monitoring	Verify power monitoring equipment is working and reporting as defined in the project documentation. Power monitoring equipment should be verified with a known electrical load where possible. If power monitoring data is being collected for an energy management system, connectivity with the system should be verified.				

VII IT: Information Technology

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
IT-100	Network Topology	Verify that the network for audio, video, and control is of a suitable topology to support the services to be delivered. Verify that real-time audio, video, and control supporting applications such as telepresence, medical procedures and live television coverage are in real-time with the live event with no delay which requires the correct network topology and low-latency encoding/decoding. Verify that all networked systems have been installed on the proper network for AV devices as required by the client and specified by the project documentation. The network and associated firewalls have been configured to allow for the network traffic and transversal to associated networks as required for proper operation as defined in the project documentation.				
IT-101	Telephony	Verify that any required telephony connections to the AV system are in place and connectivity is verified.				
IT-102	Unified Communications	Verify any connections to IT-based unified communication applications that will interface with the AV system have been planned for and integrated. Coordination for voice, video, instant message systems, and computer-based communication tools should be considered.				
IT-103	PoE (Power over Ethernet)	Verify that PoE (Power over Ethernet) devices are supplied with correct power required for device normal operation. Verify under practical conditions that the switch providing PoE has the capacity to power all of the devices that are connected to it.				
IT-104	AV IP Address Scheme	Verify and document that all network-connected equipment has the correct IP address, subnet mask, hostname, and gateway configuration as required for correct operation. This can be by static, DHCP, or reserved DHCP configuration. IP address scheme can be generated based on a list of equipment, location, VLAN requirement and MAC address.				
IT-105	IEEE 802 Wireless Networks	Verify that the correct and valid wireless network configuration (e.g., channel no., SSID, TX power) to ensure legal operation in defined areas of use. Verify that there is adequate channel separation between any client wireless networks that are required to co-exist in the same area.				

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
IT-106	Network Bandwidth	Verify that the required network bandwidth is available for control, audio, video, and data as part of either a shared or a dedicated audiovisual network. The peak load of the network will need to be determined, including how much bandwidth it consumes, when it occurs, and what the duration is. This is especially critical on shared networks where total load demands may be managed directly by IT staff or remain unknown. The peak load will need to be factored into the overall bandwidth requirements. Periods of peak loads will need to be determined prior to bandwidth testing or perform testing over a weekly or monthly cycle.				
IT-107	Network QOS (Quality of Service)	Verify that the required Quality of Service (QOS) is in place for audio, video, and data as part of either a shared network or a dedicated audiovisual network.				
IT-108	Network Performance Under Full Functional Load	Verify that the network can provide the required operational performance to carry control, audio, video, and data under production load and at times of peak production load (refer 133 Network Bandwidth).				
IT-109	Network Security	Verify that the shared or dedicated network is secure as defined in the project documentation and accessible to suit the required audio, video and control systems. Verify the network is protected from potential Information Security risks including intrusion, remote access, viruses, spy-ware, and malware, and that effective protection and homogenous policies are in place and in use for infrastructure, servers, workstations, controllers, network connected equipment and mobile devices.				
IT-110	Content Delivery Network	Verify that the content delivery network is in place and provides the required connectivity, bandwidth and Quality of Service (QOS) for the required audio, video and control systems. Verify that all required content licensing has been acquired.				
IT-111	Application Integration	Verify that the audiovisual and control systems have been integrated and fully configured with headend software, including monitoring and asset management, databases, web-based front ends, digital signage software and systems, content generation and distribution platforms, and appliances as defined in the project documentation.				
IT-112	IEEE 802 Wireless Security	Verify that the wireless network is protected in accordance with the client's information security polices from unauthorized access and provides the required connectivity for the audio, video, and control systems. Many audio, video, and control platforms do not support the full suite of wireless security policies. Verify with the client's information technology group that compatible wireless security protocols can be deployed for each product set when using a shared wireless network. Where a dedicated audiovisual wireless network is provided, verify that the potential IT wireless network is coordinated to avoid interference.				
IT-113	Digital Enhanced Cordless Telephony	Verify that the Digital Enhanced Cordless Telephony (DECT)/Unlicensed Personal Communications Services (UPCS) design can be implemented for the required number of channels given the limited number of available channels and effects of interference on system reliability and channel count.				
IT-114	Remote Access	Verify that remote access to AV and IT systems are configured as defined in the project documentation. Accounts, networks, and other credentials are provisioned and configured to allow proper offsite or off-network access. This will likely require coordination with the client's IT staff and require the client or client's support staff to participate in the testing.				
IT-115	Identity Management	Verify that all systems authentication credentials are configured correctly. Any temporary credential used during system installation and commissioning should be removed. User and group authentication and authorization are verified based on the requirements from the project documentation. Connectivity with the central directory, database or other identity authority should be verified.				
IT-116	Remote Management	Verify that remote management tools such as virtual touch panels, internal web applications, or manufacturer's applications are configured and functional as required by the project documentation and/or manufacturer's specification.				
IT-117	Enterprise Management Tools	Verify that enterprise management tools such as central monitoring client/server or web-based application have been installed and connected to all systems they are required to monitor or control as specified in the project documentation. All functionality required by the project documentation, including, but not limited to, control monitoring and reporting has been verified.				

VIII OP: Operational

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
OP-100	Battery Management Plan	Verify that a battery management plan has been completed and supplied in the project documentation package to owner.				
OP-101	System Content Provided	Verify that any system content that will be used in initial operations has been supplied to the owner, AV vendor, or third-party producer and that the system content has been has been loaded and tested in the completed AV system.				
OP-102	Content Management Plan	Verify there is a plan for managing the content to be delivered by the audiovisual systems including the means to create content, change or modify content and update content when new information needs to be conveyed.				
OP-103	Software	Verify that all control programming code, DSP configuration files, and any other associated software has been provided per the project requirements.				

IX PHYSE: Physical Environment

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
PHYSE-100	HVAC Commissioned	Verify the HVAC system has been tested and balanced prior to completing checklist item AP-122 and AP-107.				
PHYSE-101	Backing/Blocking/Framing	Verify that installed backing, blocking and framing meets project documentation requirements and industry standards for installation means and methods. Backing, blocking, and framing are installed architectural elements that supports the mounting of audiovisual devices or elements, typically in walls or ceilings.				
PHYSE-102	Floor Boxes/Wall Boxes/ Ceiling Boxes	Verify that installed floor, wall and ceiling boxes meet project documentation and regulatory authority requirements.				
PHYSE-103	Device Enclosures	Verify that device enclosures are suitable to house the device intended and that all necessary environmental controls are incorporated into the enclosure as defined in the project documentation.				
PHYSE-104	Human Factor Elements	Verify that human factor elements for audience and system users are installed and configured as defined in the project documentation.				
PHYSE-105	Structural Mounting	Verify configuration and compatibility for structural accommodations and all mounting hardware based on the intended application. All equipment mounting hardware shall be installed in the manner specified by the hardware manufacturer.				
PHYSE-106	Divisible Spaces	Verify that the divisible spaces provide the functionality specified as defined in the project documentation.				
PHYSE-107	Vibration	Verify that the physical environment is suitable for the intended audiovisual systems in relation to all sources of vibration affecting visual fidelity/stability of equipment such as video conferencing cameras, document cameras and fixed screen and projector locations.				
PHYSE-108	Lighting	Verify that that the lighting systems are suitable for the intended video and control systems for each type of application (e.g., video conferencing, presentation, broadcast, performance) as defined in the project documentation.				
PHYSE-109	Clean Building Handover	Verify that the area is clean and dust-free and suitable for equipment installation and that no further work is planned that will release contaminants into the AV equipment area. Verify that the area released is isolated from any areas not yet released.				
PHYSE-110	Protection of Installed Equipment	Verify that all elements of the AV system are free of damage.				
PHYSE-111	Finishes	Verify AV equipment, furniture, fixtures, and accessories against the project documentation.				
PHYSE-112	HVAC Operations	Verify the HVAC system has begun continuous operations in advance of equipment operations.				
PHYSE-113	Accessiblity	Verify that all systems are accessible in accordance with regulatory requirements.				
PHYSE-114	Coordinated Construction Elements	Verify that the elements, including but not limited to spatial requirements and building services required by the AV system that are coordinated with other disciplines, have been provided per the project documentation.				

X PHYSI: Physical Installation

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
PHYSI-100	Cable Containment/Conduit	Verify that installed containment/conduit capacity and routes meet project documentation requirements and industry standards for installation means and methods.				
PHYSI-101	AV Equipment Located Per Project Documentation	Verify that AV equipment is installed at the location and/or in the rack or enclosure by defined in the project documentation. Equipment is installed per the elevation or other specification provided by the project documentation or the manufacturer's specification.				
PHYSI-102	AV Equipment Labeling	Verify that all AV equipment has been labeled in accordance with the requirements of the project documentation. All labeling must be consistent, durable, accurate and visible without dismantling of sub-assemblies, including but not limited to racks and desks.				
PHYSI-103	AV Rack Thermal Gradient Performance	Verify that the AV rack(s) thermal gradient has been inspected and all equipment is operating within manufacturer's guidelines.				
PHYSI-104	Plumb and Level/Square	Verify that all AV equipment has been installed, aligned, or angled correctly as defined in the project documentation. Level and plumb are the default requirement unless particular angles or other alignment are defined in the project design.				
PHYSI-105	AV Rack Cleanliness	Verify that all components installed in AV equipment racks are free from dirt, dust, water, or any other element that would compromise the performance and/or longevity of the AV system.				
PHYSI-106	Optical Components Cleanliness	Verify that all optical components, such as lenses and mirrors, are free from dirt, dust, damage, or markings that would compromise the optical performance of those system components.				
PHYSI-107	Turnover of Accessory System Elements	Verify that any equipment that may be considered "portable" and/or otherwise not specifically incorporated into the installed AV system(s) has been setup, configured, and tested.				
PHYSI-108	Non-End-User Controls Protection	Verify that installed items with user-facing controls that are not intended for end-user access have been covered, disabled, or otherwise secured to prevent end-user operation. This includes items such as amplifier controls, power switches, or other adjustment knobs or switches.				
PHYSI-109	Equipment Security	Verify that equipment in the project is secured per the project documentation. All security systems, devices and manufacturer security accessories are installed and verified to be operating correctly within manufacturer specification. Verify that keyed devices have been keyed as defined in the project documentation and other devices requiring configuration have been configured per the project documentation and are verified to be operating within specification.				
PHYSI-110	Site Security	Verify that all elements of the AV system are free from loss, damage, or tampering.				
PHYSI-111	Handling of Accessories Otherwise Undefined	Verify that there is uniform handling of items that may have been pre-packaged with primary system equipment from manufacturers but which have no documented planned use in the AV system(s). Examples include extra (non-local) international power cords, additional remote controls and/or AV hookup cables. Unless otherwise noted in design documentation, the owner should be given the opportunity to take possession of these items in a bulk turnover during site inventory process.				

XI SERV: Serviceability

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
SERV-100	Input and Output Panel Accessibility	Verify that all input and output panels are accessible and meet all requirements for user access and placement. This includes all mounting locations including walls, floors, racks, furniture, surfaces, and/or other locations.				
SERV-101	Ability to Maintain and Service Equipment	All equipment shall be accessible and capable of being maintained, serviced, cleaned, or adjusted as necessary. All equipment requiring regular cleaning or maintenance shall be accessible without requirement for special equipment or tools that would disrupt the normal use of the facility and systems therein.				
SERV-102	Rack Clearance	Verify rack placement and use for physical stability in accordance with the project documentation and regulatory authority. Further, ensure the rack placement allows safe and complete working access for technicians to perform upgrades and on-going servicing of the system.				
SERV-103	Access Panels	Verify any panels that have been installed to provide access to any type of AV equipment are properly sized and positioned as detailed in the project documentation.				

XII WL: Wireless

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
WL-100	Wireless Coordination	Verify that the environment is suitable for the required wireless services (RF and IR) to provide audio, video, and control, and can be implemented for the required number of channels as defined in the project documentation. All devices in the system that utilize wireless signals are coordinated with each other and the existing wireless frequency spectrum (as well as with existing owner furnished equipment, equipment installed by others, and systems or services that may exist in the same geographic area) to ensure a minimum of interference or cross-talk between transmission paths.				
WL-101	Wireless Audio Systems Operation	Verify that the the operation of wireless audio systems (RF and IR) is as defined in the project documentation. This includes the proper operation of receiver and transmitter elements, that operation is free of interference, and that the wireless systems provide coverage for stationary or moving devices throughout the area specified in the project documentation.				
WL-102	Wireless Video Systems Operation	Verify that the operation of wireless video systems (RF and IR) is as defined in the project documentation. This includes the proper operation of receiver and transmitter elements, that operation is free of interference and that the wireless systems provide coverage for stationary or moving devices throughout the area specified in the project documentation.				
WL-103	Wireless Control Systems Operation	Verify that the operation of wireless control systems (RF and IR) is as defined in the project documentation. This includes the proper operation of receiver and transmitter elements, that operation is free of interference, and that the wireless systems provide coverage for stationary or moving devices throughout the area specified in the project documentation.				

XIII DOC: Documentation

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
DOC-100	As-Built Drawings Complete	Verify that a complete set of accurate as-built drawings indicating all AV devices, AV device locations, mounting details, system wiring and cabling interconnects, and all other details has been provided as defined in the project documentation.				
DOC-101	Integrator's Testing	Verify that any integrator's testing requirements have been performed and approved as defined in the project documentation.				
DOC-102	Third-Party Testing	Verify that any third party testing requirements have been performed and approved as defined in the project documentation.				
DOC-103	Final Acceptance	Verify that a final acceptance of the project has been issued by the owner or owner's representative, acknowledging that the project is 100% complete and all required deliverables, services, checklists, testing, verification and signoffs have been received, and all requirements defined in the project documentation have been satisfied and completed.				
DOC-104	Substantial/Practical Completion	Verify that a conditional acceptance of the project has been issued by the owner or owner's representative, acknowledging that the project or a designated portion is substantially/practically complete and ready for use by the owner, however some requirements and/or deliverables defined in the project documentation may not be complete.				
DOC-105	Site Inventory of AV Equipment	Verify that all equipment is in shop or on site as defined in the project documentation. List all equipment in system NOT present, and why.				
DOC-106	Owner's Testing	Verify that any owner's testing requirements defined in the project documentation have been performed and approved.				
DOC-107	Manufacturer's Testing	Verify that any manufacturer's testing requirements defined in the project documentation have been performed and approved.				
DOC-108	General Contractor's Testing	Verify that any general contractor's testing requirements defined in the project documentation have been performed and approved.				
DOC-109	Consultant's Testing	Verify that any consultant's testing requirements defined in the project documentation have been performed and approved.				
DOC-110	Software Licensing	Verify that the usage and ownership rights have been assigned as defined in the project documentation.				

CAVSP Item Number	Item Title	Description	Criteria	Responsible Party	Measurement/ Pass/Fail	Notes
DOC-111	Wireless Frequency Licensing	Verify that the correct and valid wireless frequency licensing permits have been obtained to ensure legal operation of the systems.				
DOC-112	Video System Test Reporting	Verify that the video system test report has been completed and issued to the proper entity as defined in the project documentation.				
DOC-113	Audio System Test Reporting	Verify that the audio system test report has been completed and issued to the proper entity as defined in the project documentation.				
DOC-114	Control System Test Reporting	Verify that the control system test report has been completed and issued to the proper entity as defined in the project documentation.				
DOC-115	Approval of Samples	Verify that samples of all equipment to be used as defined in the project documentation have been submitted for approval. Submission of samples of equipment to be used is often a contractual requirement. On some projects, especially larger ones a sample of every piece of equipment to be used is required. More commonly for AV projects samples of custom made equipment such as input panels is required.				
DOC-116	Delivered Product Against Samples	Where samples of products have been required for approval, verify that the products that are delivered are the same and of the same quality.				
DOC-117	User Manuals	Verify that manufacturer's user manuals are delivered to the owner in a format defined in the project documentation (binders, PDFs, etc.) or disposed of in a responsible manner (recycling), if the owner specifies that they do not wish to receive the manuals. Integrator- or programmer-created manuals and documentation shall be delivered to the owner in a format defined in the project documentation.				
DOC-118	Warranties	Verify that manufacturer's product warranty cards are provided to the owner. The owner shall be notified of the effective start date of the warranties and the coverage period. Extended warranties that require activation shall be activated by the integrator or otherwise as defined in the project documentation. If activated by the integrator, proof of activation and effective coverage dates will be provided. Integrator provided warranties on labor and workmanship shall be provided to the owner with an effective start date and coverage period. Integrator provided extended warranties on products shall be provided to the owner with an effective start date and coverage period. Third-party warranty information shall be provided to the owner with an effective start date and coverage period.				
DOC-119	Final Commissioning Report and System Turnover	Verify that the final commissioning report has been completed, issued to the proper entity, and accepted as defined in the project documentation.				
DOC-120	Required Close-Out Documentation	Verify that a complete set of as-built system documentation has been provided as defined in the project documentation.				